r 1947

Chemical Industries

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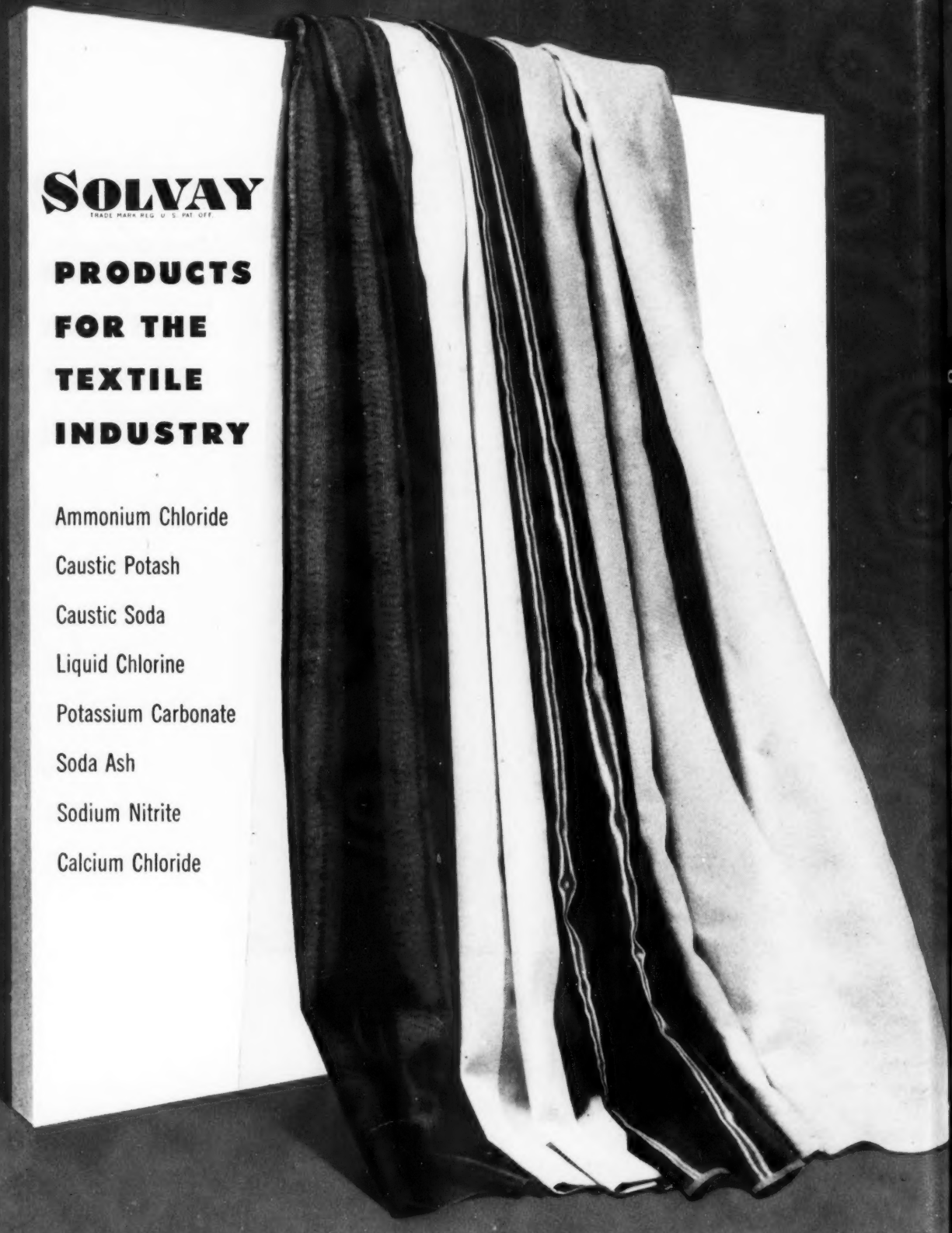
FOR OVER 65 YEARS THE FINEST QUALITY

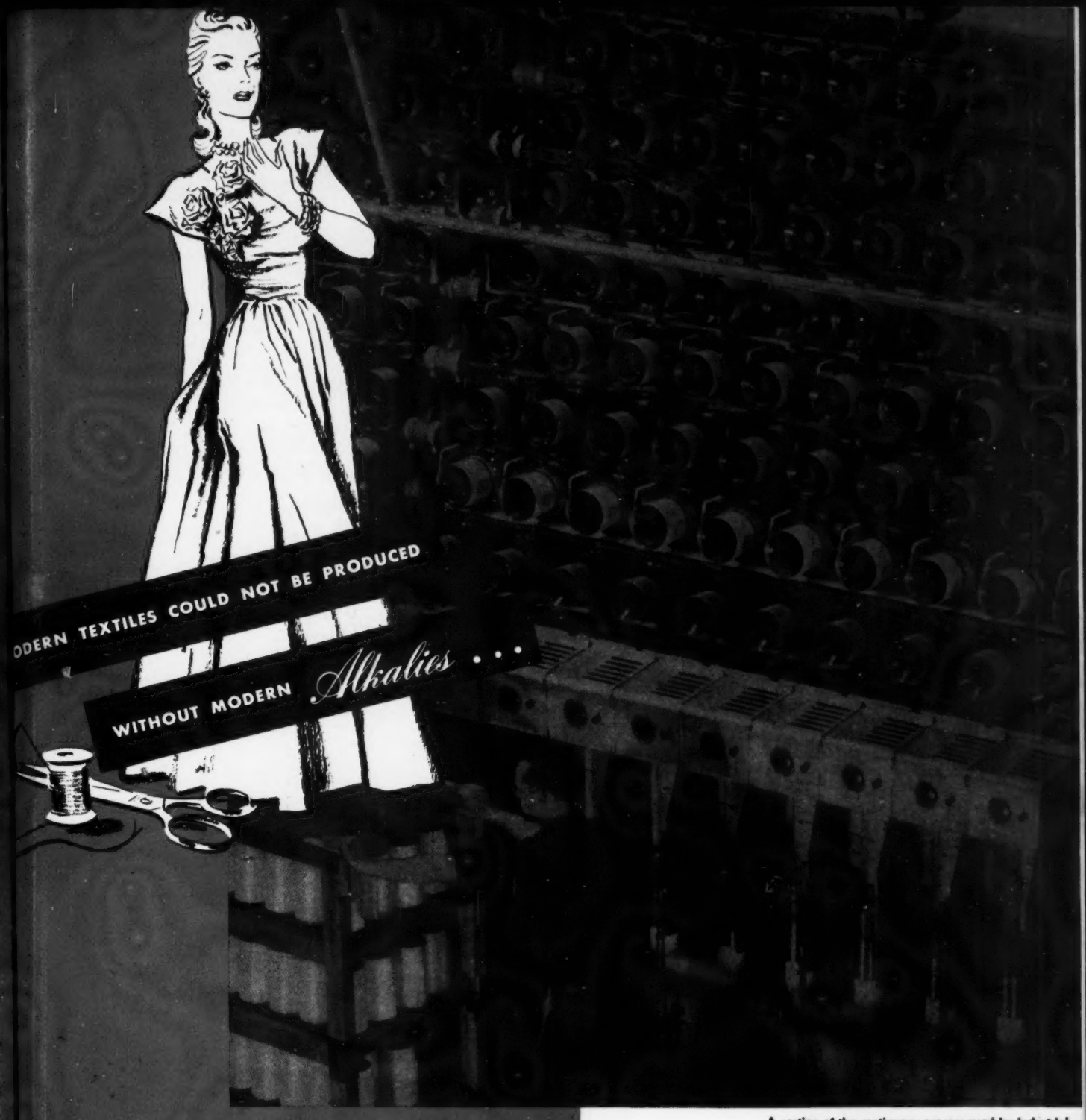


SOLVAY
TRADE MARK REG. U. S. PAT. OFF.

PRODUCTS FOR THE TEXTILE INDUSTRY

Ammonium Chloride
Caustic Potash
Caustic Soda
Liquid Chlorine
Potassium Carbonate
Soda Ash
Sodium Nitrite
Calcium Chloride

SOLVAY SALES CORPORATION • *Alkalies and Chemical Products Manufactured by The Solvay Process Comp*
40 Rector Street, New York 6, N. Y.

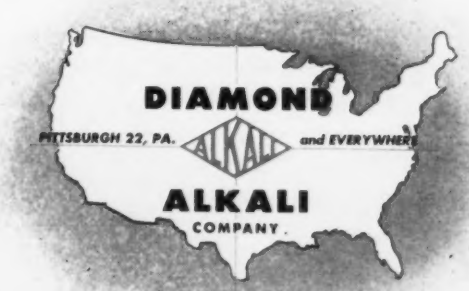


A section of the continuous process used by Industrial Rayon Corporation in the manufacture of their products.

DIAMOND ALKALIES

are widely used in the manufacture of woolen, rayon, cotton and linen fabrics

Diamond Caustic Soda is used for mercerizing and kier boiling of cotton and is an important raw material in the manufacture of rayon. *Soda Ash* aids in the washing of fabrics, water softening, and acid neutralizing. *Silicates of Soda* are used for silk weighting and in connection with peroxide bleaching operations, and are widely used as detergents. *Diamond Liquid Chlorine* is used for the preparation of sodium hypochlorite bleaching agent, and one of its derivatives, *Chlorowax,* has unsurpassed water-resistant qualities useful to the textile industry. Each of these operations requires special types and grades of alkalies.



the Safe Bleach-

SODIUM CHLORITE

WON'T DEGRADE PULPS, FATS OR FIBERS

When most standard bleaching agents have oxidized up to a certain point—comes the attack! Fibers are tendered; pulps lose strength; fats revert . . . further bleaching must stop, or be subject to close, costly control.

It's a different story with Mathieson's Sodium Chlorite—and its co-product Chlorine Dioxide—the new bleaching agents which do not degrade pulps, fats or fibers, and hence permit safe bleaching to new highs in whiteness.

Mathieson
SODIUM CHLORITE

Sodium Chlorite Products . . . Chlorine Dioxide
Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda
Liquid Chlorine . . . Ammonia, Anhydrous & Aqua
HTH Products . . . Fused Alkali Products . . . Dry Ice . . . Carbonic Gas . . . Sodium Methylate

WHITE COTTON WITH STRENGTH

Cotton fibers, when bleached with Mathieson's Sodium Chlorite (Textone) and hypochlorite, are not attacked. Thus better whites are possible with no loss of tensile strength . . . solutions need only slight control.

HIGH BRIGHTNESS IN PULP

Paper pulps reach very high brightness levels when bleached with chlorine and chlorine dioxide mixtures. Degrading effects are negligible, and pulp yields are high. The mixed-in chlorine cuts costs.

UPGRADING FATS NOW EASY

Lower grade fats are easily improved to a quality suitable for high-grade soaps, by bleaching with Mathieson's Chlorine Dioxide. No deterioration . . . improved color and odor . . . much higher yields.

Sodium Chlorite—a Mathieson development—is a stable chemical which is used directly for many bleaching and oxidizing purposes . . . or used in conjunction with hypochlorite . . . or as a convenient source of the powerful oxidizing agent, Chlorine Dioxide. Details on the many applications are yours for the asking. Write to: Sales Development Department, The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York 17, New York.

Chemical Industries

"SERVING THE CHEMICAL PROCESS INDUSTRIES"

VOLUME 61—NUMBER 4 **OCTOBER, 1947**

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New Rubber Catalyst
Synthetic Lubricants
Tailor-made Resins
Air Deodorization
Lignin Research
Plastic Bubbles
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Cover: Courtesy of Dixie Chemical Works, Commercial Solvents Corp. Picture Credit—Page 613—Ewing Galloway. Picture Credit—Page 632—Warner & Swasey.

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THE READER WRITES

View on Science Bill Veto

To the Editor of Chemical Industries:

In the editorial on page 203 of your August number, "Government by the People," you are absolutely wrong. What President Truman really means and wants is that all science research should be put in the hands of the labor strike leaders and labor unions. They are the voters who count and who win elections. All government employees in Washington, and College Park, Md., are required to join the C.I.O. I was fired because I refused to join the C.I.O., so I ought to know.

WM. S. MANN
P. O. Box 61
Healdsburg, Calif.

Technical Books For the Finns

To the Editor of Chemical Industries:

Finland has an excellent and keenly scientific minded Technical Institute, Teknillinen Korkeakoulu. During the war its library was bombed and totally destroyed.

On my recent trip to Finland for the American Friends Service Committee, I discussed the situation with Dr. Martti Levon, Director of the Institute. He said he would welcome gifts of Scientific and Technical Books and Periodicals from America to take the place of those destroyed. In the remarkable efforts for recovery that the Finns are making, the lack of technical library facilities is a very serious handicap. It would be a practical act of friendship to a nation that holds America in high regard if Americans should contribute good technical books and periodicals to this library.

Any such gifts should be marked for the Institute of Technology, Helsinki, and sent to the Legation of Finland, 2144 Wyoming Ave., N. E., Washington, D. C. Dr. K. T. Jutila, the Finnish Minister, will arrange for their being shipped to Finland.

ARTHUR E. MORGAN
Yellow Springs, Ohio

Favorable Reaction

To the Editor of Chemical Industries:

I've been intending to write you a letter to report the extremely favorable reaction of members of our organization to your "What's New" section. Someone is doing a first-class job of chemical reporting, and we want you to know that at least some of your readers appreciate it.

Your "Newsletter" has also proved a source of interest here so that now I make a point of reading it myself, and I can assure you I fall far short of reading all the publications to which we subscribe.

DR. CARL S. MINER, Director
The Miner Laboratories
9 S. Clinton Street
Chicago 6, Illinois

Superlative Synthetics

To the Editor of Chemical Industries:

I am very much interested in the article "Superlative Synthetics" appearing in your July, 1947, issue and would appreciate it if you will send me six reprints.

I am a new subscriber to your magazine and look forward to reading similar interesting articles in future issues.

R. LENZ
General Dyestuff Corporation
435 Hudson Street
New York 14, N. Y.

Control Terminology Valuable

To the Editor of Chemical Industries:

Thank you for the reprints of "Automatic Control Terminology" you were kind enough to send me. We have found your material to be very useful in explaining automatic control to the new men we are bringing in and training.

P. D. SCHNELLE
Supervising Instrument Engineer
Monsanto Chemical Co.
Oak Ridge, Tenn.

Commercial Solvents, Not Pfizer

To the Editor of Chemical Industries:

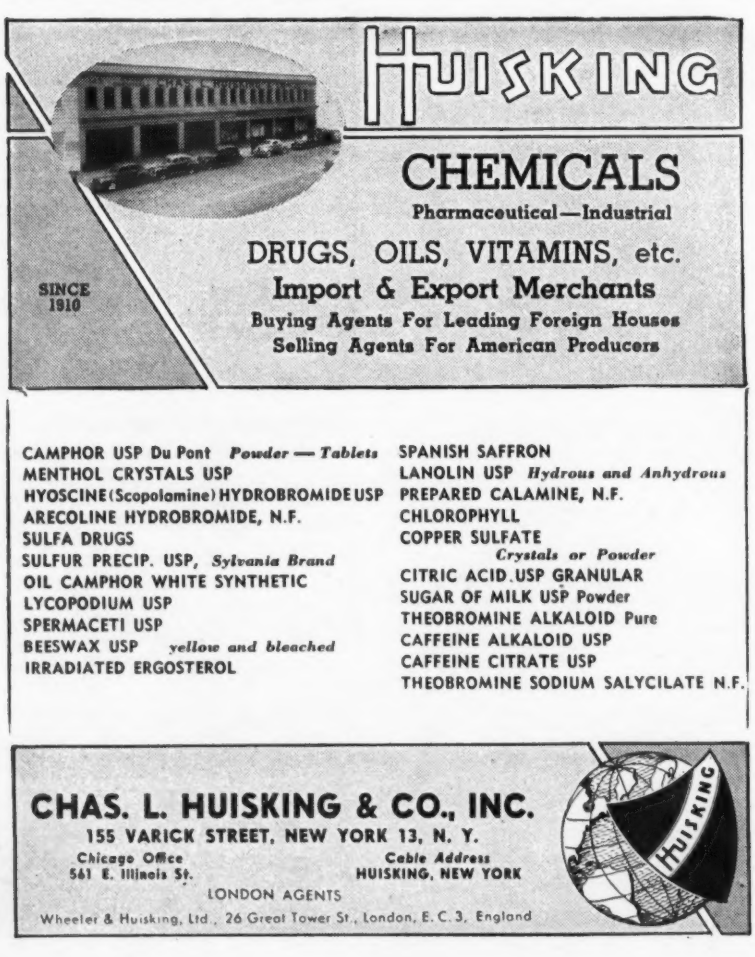
In your September issue of CHEMICAL INDUSTRIES, on page 420 you have a photograph the caption of which is incorrect in that it states that the picture is a view at the plant of the Charles Pfizer Co.

Actually, this is one of our own photographs taken in Commercial Solvents' Penicillin Plant at Terre Haute, Ind.

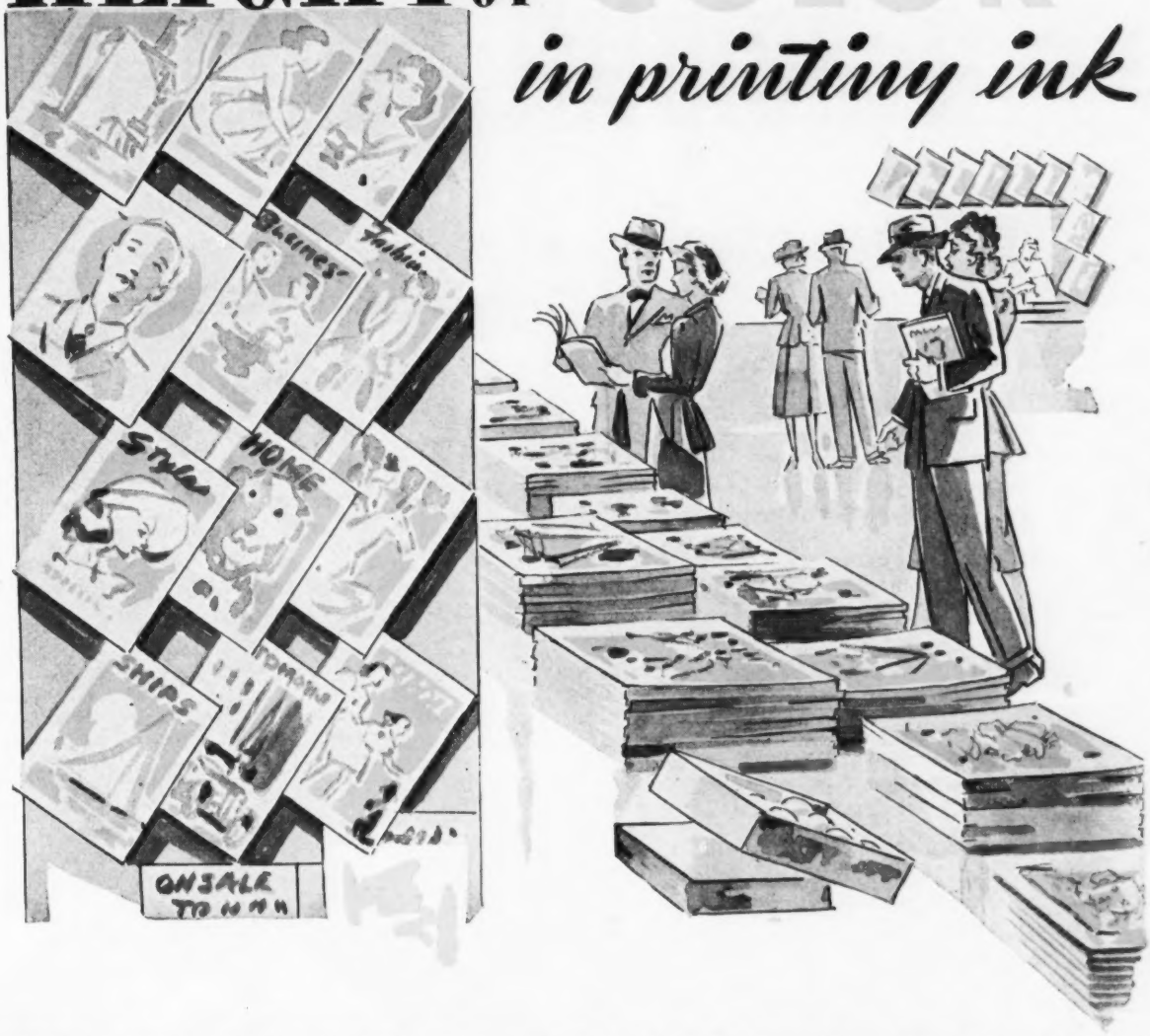
E. N. THOMAS
Sales Promotion Division
Commercial Solvents Corp.
New York, N. Y.

Chemical Industries regrets its error.—EDITOR.

ALLAN J. ANDERSON has been appointed manager of the American Potash & Chemical Corp. plant at Trona, California. He succeeds WALTER J. METZGER, who resigned. He was appointed assistant Trona manager in 1946.



the HEIGHT of COLOR *in printing ink*



Yellow *is* colorful! Psychologically, it is the most cheerful of all the colors in the spectrum. In terms of legibility, black letters on a yellow background top the list of all color combinations.

Since the successful development of color process printing by Frederick Ives, in 1883, Chrome Yellows have been the most widely used yellow printing ink pigments. Of these, the best quality medium yellow is commercially pure Lead Chromate. It is a brilliant yellow with great covering power and makes an ideal printing ink pigment as it mixes quickly and well with the vehicles commonly used.

Mutual's Bichromate of Soda has been preferred by leading pigment manufacturers since the inception of color printing. Its unvarying purity, coupled with the technical knowledge of the oldest producer of Chromium Chemicals, accounts for this preference.

Mutual's Research Department is willing to collaborate with anyone using, or contemplating the use of, Chromium Chemicals in their industrial operations.

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MUTUAL CHEMICAL CO. OF AMERICA — MUTUAL — NEW YORK N.Y.

Mutual

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This helpful booklet outlines the major fields of usage for fatty acids and their derivatives, explaining for each the properties needed, functions performed, and types of acids commonly used. Applications discussed include:

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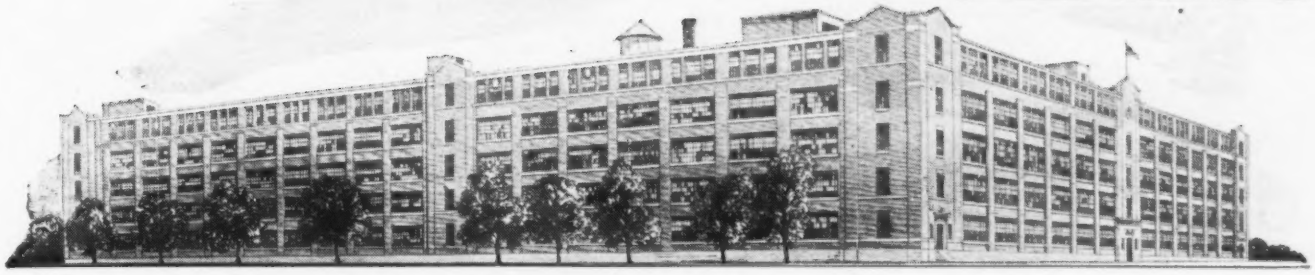

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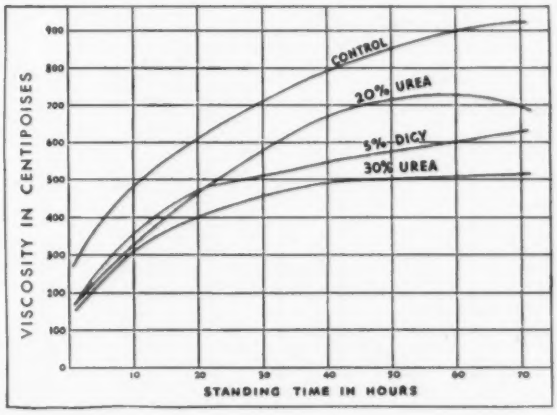
AERO Dicyandiamide is finding an ever widening field of application as an additive in the formulation of starch adhesives. It is currently available in commercial quantities.

The use of "Dicy" in this field offers a unique combination of advantages:

- **Stronger bond.** Reduction of the initial viscosity substantially eliminates excessive degradation of the starch molecule.
- **Longer shelf or tank life.** Normal viscosity increases are delayed.

(The accompanying curve illustrates the actual realization of these advantages with a representative dextrine.)



- **Lower cost.** Smaller amounts of "Dicy" used as compared with urea effect a definite saving in cost.
- **Excellent rewetting characteristics.**
- **Negligible decomposition up to 176° F.**

We suggest that you mail the attached coupon to obtain a sample and technical data for your own evaluation. Our technical representatives will be glad to discuss with you, at your convenience, your particular application of this highly useful additive.

*Trade-mark

AMERICAN Cyanamid COMPANY
Industrial Chemicals Division
Headquarters For Nitrogen Chemicals

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Section ON, Synthetic Organic Chemicals Dept.
30 Rockefeller Plaza, New York 20, N. Y.

Gentlemen:

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Ethyl Cellulose

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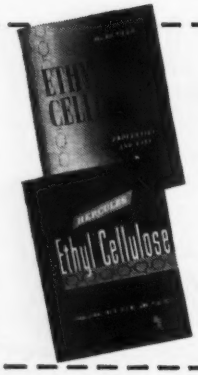

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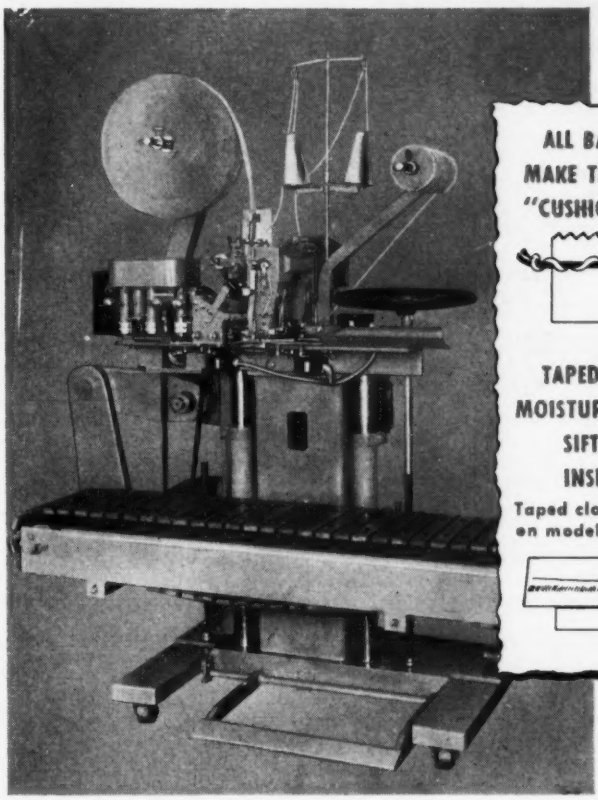

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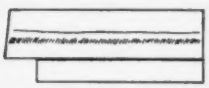
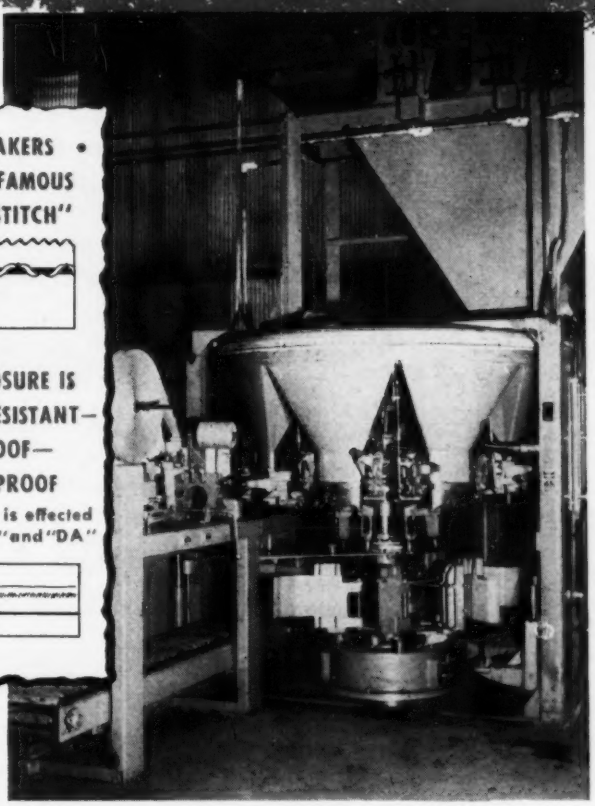
TAPED CLOSURE IS MOISTURE RESISTANT— SIFT PROOF— INSECT PROOF

Taped closure is effected on models "A" and "DA"





MODEL "D A" (portable)—One operator, filling and closing, can handle 2 to 4 100-lb. bags a minute . . . 6 to 12 a minute where filled bags are delivered to BAGPAKER conveyor (quickly adjustable for various bag sizes). Starting and stopping of sewing operation is automatic, no tape wasted.

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At absolutely no obligation to you, a BAGPAK engineer will gladly discuss your packaging machinery and multiwall paper bag requirements . . . show you the best methods of weighing, closing and handling bags.

**Manufacturers of famous CUSHION STITCH OPEN MOUTH MULTIWALL PAPER BAGS*

• Reg. U. S. Pat. Off.

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Better
Greater Economy

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Calcium Stearate Impalpable Powder Grade A

* **BULK**—*6 lbs. per cubic foot*

† **FINENESS**—*99½% through 325 mesh*

¶ **HEAVY METALS**—*Meets food standards*

¢ **WATER SOLUBLE SALTS**—*Less than 0.1% as chloride*

* When packed, 11.5 lbs. per cubic foot. Easily fluffed back to 6 lbs. per cubic foot.

† This means that all aggregates will pass the finest commercially used screen. Actually the ultimate particles are of the order of 3 to 5 microns in size. This insures smoothness and freedom from grit.

¶ This means that the excellent properties of the new material can be applied to food and pharmaceutical uses.

¢ This means that, with the use of this lubricant, electrical parts can be molded without affecting electrical resistance. It also means that emulsions are easily made and permanent when this compound is used in them.

A refinement of manufacturing techniques—backed by 80 years of experience—gives industry a new and better *Calcium Stearate Impalpable Powder Grade A,* with enhanced use values at greater economy than ever before. Other stearates are also improved correspondingly. For further information ask your nearest Mallinckrodt office.

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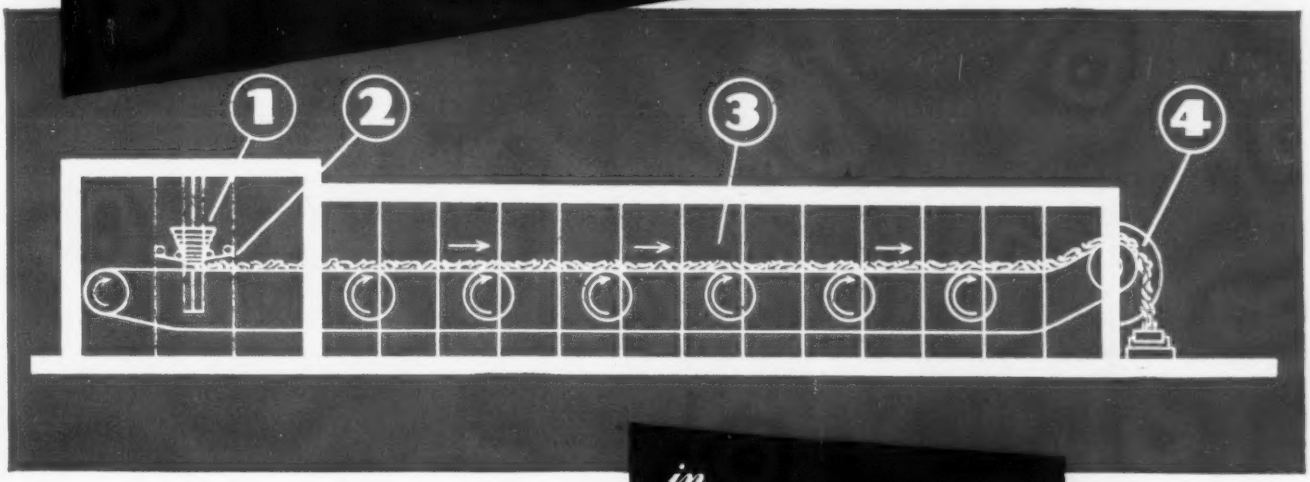
ZINC OXIDE

REDUCED TO 0.25% (B.D.W.B.*) MOISTURE CONTENT AT RATE OF 1,830 POUNDS PER HOUR

*BONE DRY WEIGHT BASIS



in PROCTOR *Continuous Conveyor System*

Tonnage production of thoroughly, uniformly dried zinc oxide was converted from a production dream into a reality with the installation of a Proctor continuous conveyor drying system, combined with a preforming feed.

Here is how the Proctor system operates in the handling of zinc oxide. ❶ Having been mechanically dewatered by means of a continuous filter, the still highly moist zinc oxide is deposited into the hopper of a Proctor rolling extruder feed. ❷ In this rolling extruder feed, the material is forced through a perforated plate by rolls moving back and forth and deposited in spaghetti-like extrusions onto the conveyor of the dryer. This particular type of preforming feed is used because the physical characteristics of the zinc oxide are such as to permit it holding a definite shape after extrusion. ❸ Entering the dryer, with a moisture content of 69.5% (B.D.W.B.), these extrusions of zinc oxide lie in a bed on the perforated plate continuous conveyor of the dryer. The shape of the uniformly thick extrusions makes it possible for heated air at a temperature of 275°F. to circulate *through* the bed of material—thus promoting rapid diffusion and subsequent speedy, thorough and uniform drying. ❹ After 105 minutes of drying time, the extrusions of zinc oxide are discharged with a moisture content of 0.25% (B.D.W.B.)—uniformly dried at the rate of 1,830 pounds per hour (C.D.W.).

This installation represents one more instance where Proctor engineers converted facts gathered in the laboratory and translated those facts into a drying system that is meeting a specific need in the chemical process industries. Each Proctor system is individually designed to meet individual product and plant requirements. If drying is a part of your plant operation, you may be pleasantly surprised at what an individually designed Proctor drying system can do for your production. Consult Proctor engineers without obligation.

PROCTOR & SCHWARTZ, INC.
PHILADELPHIA 20, PA.

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21st Exposition of Chemical Industries

DEC. 1-6

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High quality Celanese Formaldehyde U.S.P. is sold commercially as Formalin—a water white solution containing 40% Formaldehyde by volume, 37% by weight. It is obtainable in both methanol inhibited and uninhibited grades.

A clear, colorless liquid, controlled to meet the most exacting requirements, Celanese Formaldehyde is widely used in resins, adhesives, plastics and in the production of other organic chemicals.

For samples, specifications and technical data on methods of handling, write to Celanese Chemical Corporation, division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

Look to Celanese for FORMALDEHYDE, ACETALDEHYDE, PROPIONALDEHYDE—members of the expanding family of Celanese Chemicals.*

A NEW TYPE

GLYCOL

2-METHYL-1, 3-PENTANEDIOL

Combining solvent, lubricating and penetrating properties.

Containing one primary and one secondary hydroxy group, Celanese Methyl-Pentanediol has unusual solubility for a wide variety of resins, and is miscible with most common organic solvents. Its high boiling point (215°C) plus limited solubility in water give it a combination of properties not found in any other glycol now in use.

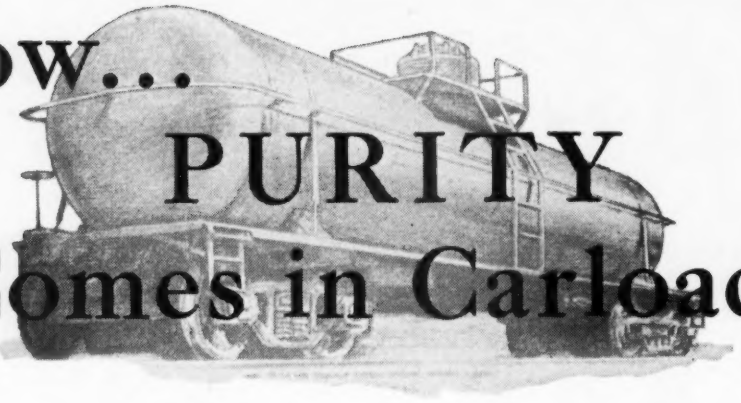
Call on Celanese for technical assistance and information regarding the application of Methyl-Pentanediol in your field. Our Field Technicians and Research Facilities are always at your service.

Celanese Chemicals

*Reg. U.S. Pat. Off.

ALCOHOLS • ALDEHYDES • GLYCOLS • KETONES • ORGANIC ACIDS • SOLVENTS • PLASTICIZERS • INTERMEDIATES

Now... PURITY Comes in Carloads



For the first time, sorbitol is available in carloads—with a new concept of purity—for new uses and new thinking.

Where once it was tons, now it is carloads. Greatly expanded production facilities—just completed—have opened fresh vistas for the chemical industry, and suggest new evaluation of this remarkable chemical.

Sorbitol, a hexahydric alcohol, may be used advantageously

—As a Manufacturing Ingredient in

DRYING OILS
HARD RESINS
ALKYDS
ESTERS
ETHERS
PLASTICIZERS

—As a Conditioning Agent and Humectant in

COSMETICS
FLEXIBLE GLUES
LEATHER
PAPER
GELATIN
CHEWING GUM
CANDY
TOBACCO
GASKETS
POLISHES
YEAST
SOFT DRINKS
PHARMACEUTICALS
PRINTERS' ROLLERS

Available in Two Grades . . . in Drums or Tankcars

SORBO
A 70% aqueous solution of D-sorbitol. Water-white, with clean, sweet taste. No odor. For synthesis and moisture-conditioning. By improved technique, this grade is now offered in greater purity than ever before.

ARLEX
Atlas commercial sorbitol solution, containing closely related polyhydric materials which make it non-crystallizing. For flexibilizing and moisture-conditioning.

The Atlas technical staff is especially qualified to discuss sorbitol applications with you. Bring your problems to us.

Sorbo, Arlex—Reg. U. S. Pat. Off.

ATLAS INDUSTRIAL CHEMICALS DEPARTMENT

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

Don't listen to Back-Fence Gossip

THERE'S PLENTY OF *Furfural* FOR ALL

We'll let you in on a secret. The recent announcement that furfural will soon be used in the manufacture of nylon was no surprise to us. And should this new use for furfural be followed by announcements of the adoption of furfural for other process industries you can be pretty sure that we will have had foreknowledge of those new requirements as well.

All of which means, that we have an ample supply of furfural for your needs. Present capacity of our two plants at Cedar Rapids, Iowa, and Memphis, Tennessee is upwards of 50,000,000 pounds per year. New techniques in manufacture indicate that even greater output can be obtained in present facilities and even these facilities are being continually expanded to meet anticipated demands.

So to you who are working with furfural experimentally now, we suggest that you intensify your development program without worry about availability. To you who have not yet investigated furfural's possibilities in your processes, may we suggest that the versatility of furfural as shown by its present uses, indicates there are still greater developments on the way. Perhaps you may be the one to make the headlines.

Quaker Oats Technical Staff will be glad to work with you on the application of furfural or the other furans to your particular problems.

The Quaker Oats Company — **CHEMICALS DEPT.**

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141 W. JACKSON BLVD., CHICAGO 4, ILLINOIS

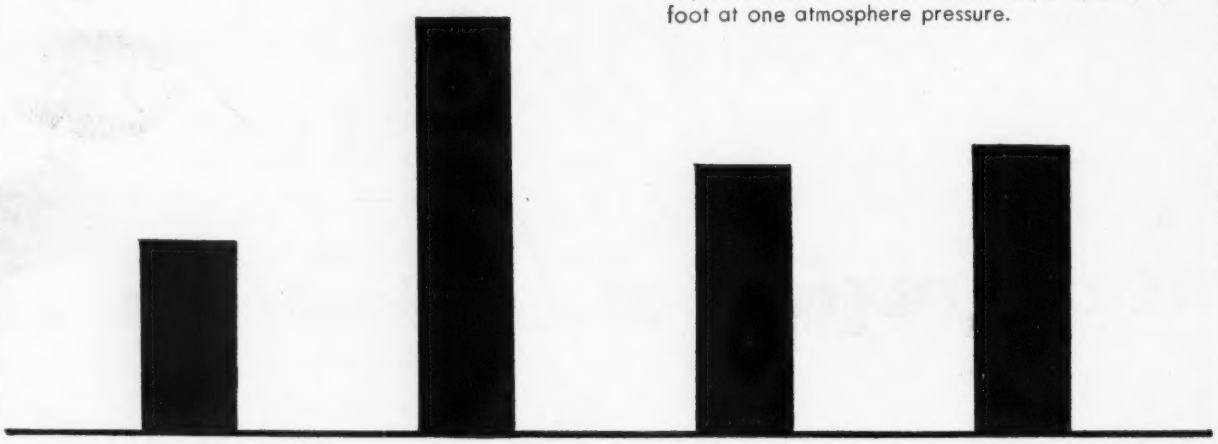
EASTERN SALES OFFICE, 1232 WHITEHALL BLDG., 17 BATTERY PLACE, NEW YORK 4, N. Y.

In the United Kingdom, Quaker Oats Ltd., Southall, Middlesex, England — In Europe, Quaker Oats-Graanproducten N. V., Rotterdam, The Netherlands
In Australia, Swift & Company, Pty. Ltd., Sydney

FURFURAL • FURFURYL ALCOHOL (FA) • FUROIC ACID • TETRAHYDROFURFURYL ALCOHOL (THFA)

*Ultra Drying** of gases in fixed bed systems with Davison Silica Gel

*Ultra Drying refers to drying gases to the vicinity of a minus 85°F. dew point . . . Using air as an example this amounts to less than one-millionth of a pound (6.68×10^{-7}) of water vapor per cubic foot at one atmosphere pressure.



Relative Volumes of Gas Ultra Dried by Equal Volumes of Various Desiccants in a Fixed Bed System.

Davison Silica Gel has the ability to do the Ultra Drying job effectively and the physical strength to stand up in service. Its adsorptive properties are not impaired in the regeneration of the bed.

For Ultra Drying Davison research has developed a desiccant which removes water vapor from gaseous streams down to the vicinity of a minus 85°F. dew point in *practical operating-systems.*

THE DAVISON CHEMICAL CORPORATION

Progress through Chemistry

BALTIMORE 3, MARYLAND

PIONEERS . . . DEVELOPERS . . . AND PRODUCERS OF SILICA GEL

DOUBLE CHECKED from RESEARCH to INDUSTRY

use SHARPLES ETHYLETHANOL-AMINES 161

for Emulsions

Self-Polishing Floor Waxes	Emulsion Paints
Automobile Polish	Agricultural Sprays
Furniture Polish	Cosmetic Formulations
Textile Lubricants	Other Oil in Water Emulsions

Ethylethanolamines 161 is a mixture of ethylmono- and ethyldiethanolamines and is an efficient and economical intermediate for emulsion formation. Ethylethanolamines soaps formed by the reaction of this Sharples product and oleic and similar acids are efficient emulsifying agents.

We suggest that you investigate the use of Ethylethanolamines 161 in your product.

Sharples Reports 47-7 "Emulsions" and 46-10 "Emulsion Paints" and samples are available upon your request.

SHARPLES TRADE MARK CHEMICALS

Sharples Chemicals Inc.

PHILADELPHIA CHICAGO NEW YORK

SHARPLES SYNTHETIC ORGANIC CHEMICALS

PENTASOL* (AMYL ALCOHOLS) BURAMINE* (BUTYL UREA, Tech.)
ORTHOPHEN* (o-AMYLPHENOL)
PENT-ACETATE* (AMYL ACETATE) PENTAPHEN* (p-tert-AMYLPHENOL)
PENTALARM* (AMYL MERCAPTAN) VULTACS* (ALKYL PHENOL SULFIDES)
PENTALENES* (AMYL NAPHTHALENES)

AMYLAMINE ETHYLAMINE BUTYLAMINE
DIAMYLAMINE DIETHYLAMINE DIBUTYLAMINE
TRIAMYLAMINE TRIETHYLAMINE TRIBUTYLAMINE
DIETHYLAMINOETHANOL
ETHYLETHANOLAMINES 161
DI-sec-AMYLPHENOL
TETRAETHYLTHIURAM DISULFIDE
TETRAETHYLTHIURAM MONOSULFIDE
TETRAMETHYLTHIURAM DISULFIDE
ZINC DIETHYLDITHIOCARBAMATE
ZINC DIMETHYLDITHIOCARBAMATE
ZINC DIBUTYLDITHIOCARBAMATE
SELENIUM DIETHYLDITHIOCARBAMATE

AMYL CHLORIDES o-tert-AMYLPHENOL o-sec-AMYLPHENOL
DICHLORO PENTANES DI-tert-AMYLPHENOL AMYL SULFIDE
DIAMYLPHENOXYETHANOL

* Trademark Registered

SHARPLES CHEMICALS INC.

EXECUTIVE OFFICES: PHILADELPHIA, PA.
PLANT: WYANDOTTE, MICH.

Sales Offices

NEW YORK CHICAGO

West Coast: MARTIN, HOYT & MILNE, INC., Los Angeles . . San Francisco . . Seattle
Mining Representative: ANDREW CLAUSEN, 1826 Herbert Ave., Salt Lake City 5, Utah
Canada: SHAWINIGAN CHEMICALS LTD., Montreal, Quebec . . Toronto, Ontario
Export: AIRCO EXPORT CORP., New York City

Have you considered new uses for Carbon Disulfide—(Bisulfide)?

Many chemists and chemical engineers are finding that CS_2 offers a possible starting point for a wide variety of organic reactions. Because Carbon Disulfide is a low-cost basic material—and is obtainable as an extremely pure chemical—the appeal for new uses is particularly strong.

Baker's method of manufacturing Carbon Disulfide is unique. An unusual electro-thermic method is coupled with continuous rather than batch distillation. This further insures uniformity of the finished product.

By using this Baker method and exercising extreme care in the choice of raw material, Baker's Carbon Disulfide is unusually free from other sulfides (assaying 99.99%).

If you are in development work and contemplate the use of Carbon Disulfide as a basic raw, we invite correspondence against present and future needs.

We have increased plant facilities, and are now in a position to serve more customers well.

J. T. Baker Chemical Co., ***Executive Offices and Plant:*** **Phillipsburg, N.J.** ***Branch Offices:*** **New York, Boston, Philadelphia and Chicago.**

Baker's

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

Baker's

This advertisement in The Saturday Evening Post features Barrett Rubber Compounding Chemicals and shows the vital part played by the rubber industry in raising the American standard of living.

HOW MANY rubber articles in this picture? That's a game you could play almost *anywhere*, for rubber is an ever-present part of our living. To adapt rubber for its varied applications, the rubber industry relies heavily upon chemicals, like CUMAR* resin, which are supplied by Barrett.

HOW BARRETT SERVES THE RUBBER INDUSTRY. Barrett CUMAR* resin and more than a score of other Barrett Rubber Compounding Materials are widely used by the rubber industry to impart desired degrees of hardness, softness, elasticity, wear resistance or other characteristics to natural, synthetic and reclaimed rubber. You benefit from their use in automobile tires and tubes, garden hose and rubber footwear, gloves, wire insulation, friction tape, adhesives and hundreds of other items in daily life. Helping American industry in basic ways has made Barrett **ONE OF AMERICA'S GREAT BASIC BUSINESSES.**

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET NEW YORK 6 N. Y.

BARRETT CHEMICALS FOR INDUSTRY

Phenols
Cresols
Cresylic Acids
Chlorinated Tar Acids
Xylenols
Pickling Inhibitors
Benzol

Toluol
Xylol
Naphthalene
Hi-Flash Solvent
Phthalic Anhydride
Dibutyl Phthalate
Dicyclohexyl Phthalate

Plasticizer 50 B
Niacin (Nicotinic Acid)
Pyridines
Picolines
Quinoline
Tar Acid Oils
Neutral Coal-Tar Oils

Creosote Oil
CUMAR* Paracoumarone-Indene Resin
Carbonex* Rubber Compounding Material
Bardol* Rubber Compounding Material

Cyclohexanol
Flotation Agents
Anhydrous Ammonia
Ammonia Liquor
Sulphate of Ammonia
Ammonium Nitrate
Arcadian* The American Nitrate of Soda

* Reg. U. S. Pat. Off.

SODIUM NITRITE

PRIOR CHEMICAL CORPORATION - NEW YORK

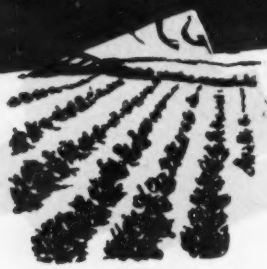
420 LEXINGTON AVENUE

Chicago Office: 230 North Michigan Ave.

LIVESTOCK

To help you meet
AN EVER-GROWING MARKET—

Baker's DDT



CROPS

FORESTS

PUBLIC PLACES

Use of DDT spreads every year. More and more people depend on DDT for controlling certain insect pests of livestock, crops, gardens, homes, orchards, forests, and public places.

Farmers find spraying cattle with DDT during fly season often increases beef gains as much as ½ to 1 pound per day . . . increases milk production as much as 20 per cent. Spraying potatoes increases yields up to 25 per cent, sometimes more.

Public officials and owners of recreational facilities spray parks, ball fields, grandstands, resorts, and other public places with DDT—to help promote public health, as well as make the facilities more enjoyable.

Foresters recently sprayed 387,000 acres of forest land in the Northwest with DDT to save an estimated $60,000,000 worth of timber from Douglas fir tussock moths. In the Northeast forests DDT is being used to control the gypsy moth.

Increased use of DDT means an expanding market to those who formulate insecticides. Get set now for next year's sales.

Baker's DDT is a granular product approaching a white color, with a minimum setting point of 89° C. It is uniform in color, makes a clear solution, is free flowing and uniform in particle size. This enables the manufacturer to perfect his mix before grinding.

Baker's DDT comes in 25, 50, 100 and 200-lb. containers. We invite you to write for prices and tell us your requirements. Address *Agricultural Chemical Division*, J. T. Baker Chemical Co., Phillipsburg, N. J.

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

A load on this truck is a load off your mind

Specify U. S. I. — and your resin worries are over.

Because U.S.I. resins (natural and synthetic) are engineered to help you produce top quality coatings at prices that are right. And in today's highly competitive market — *that means sales!*

So when you're ordering resins — *specify U.S.I.* Our offices are as near as your phone.

Natural and Synthetic Resins

U.S.I.

INDUSTRIAL CHEMICALS, INC.

60 East 42nd Street, New York 17, N. Y.

Branches in All Principal Cities

IMPROVE YOUR PRODUCTS WITH

Abril WAXES

AND EMULSIFYING AGENTS

Technically Sound

Unique Properties

Wide Range

Used in Polishes, Printing Inks, Crayons, Carbon Papers, Plastics, Rubber Mixes, Paints, etc.

ABRIL 1

ABRIL E

ABRIL X

ABRIL 8 N S
(M.P. 120°C)

ABRIL 10 D S
(M.P. 140°C)

ABRIL B P B
(M.P. 170°C)

Used in Cosmetics, Cream Polishes, Emulsions of all kinds.

ABRIL E

ABRIL N

ABRIL B J

ABRIL N D

ABRIL J W

★ Also ABRIL Emulsifying Agents, interesting for both O/W and W/O dispersions.

★ A further range of special products in preparation.

Agents for U.S.A.

DISTRIBUTING & TRADING COMPANY INC.

444, MADISON AVENUE, NEW YORK, 22, N.Y.

Produced in Great Britain by

ABRIL CORPORATION (GT BRITAIN) LTD., 25, HANOVER SQUARE, LONDON, W.1

COMPOSITION

Zircon (Zirconium Silicate) $ZrSiO_4$ . . 67% ZrO_2+33% SiO_2

MECHANICAL, THERMAL, CHEMICAL AND PHYSICAL PROPERTIES

Crystal Structure	Tetragonal
Molecular Weight	183
Molecular Volume	38.7
Moh's Hardness	7.5
Thermal Conductivity cal/°C/sec/cm/cm^2 (up to 700°F=0.031 Watts/in^2/in/°F)	0.0046
Refractive index Ne	1.94-2.02
Refractive index for No	1.92-1.96
Birefringence	0.045-0.058
Mean Specific Heat (21-51°C)	0.132
Softening Point	3452°F
Melting Point	4622°F
Thermal Expansion (mean reversible 20°-1000°C)	4.5x10-⁶/°C

Insoluble in aqueous alkaline solutions and in all acids except hydrofluoric (slightly soluble).

ELECTRICAL PROPERTIES

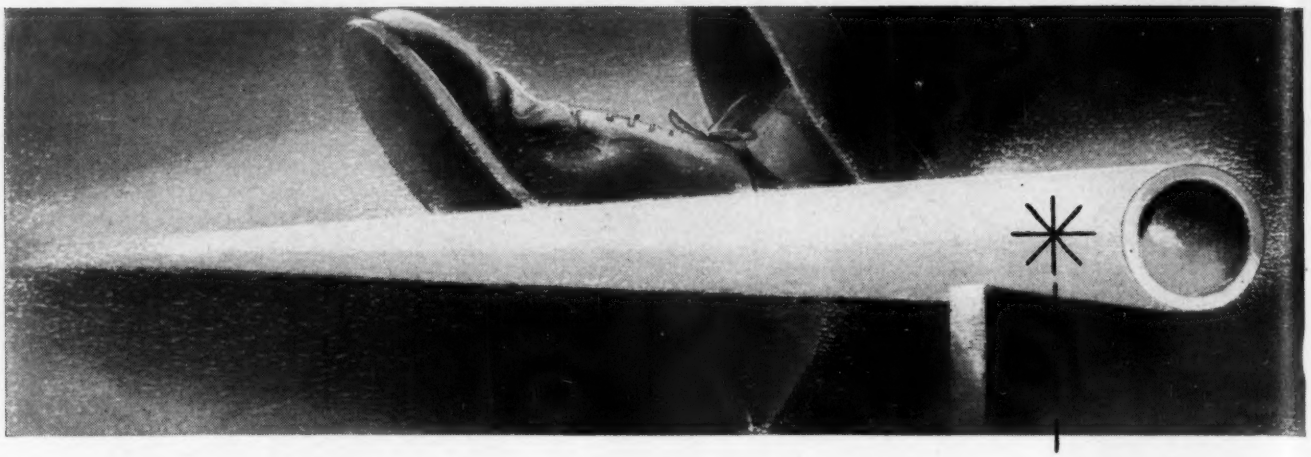
Dielectric Constant E		12±1
Resistivity at °F in Megohms/in^3	1100°	170
	1200°	120
	1300°	70
	1400°	25
	1500°	7
	1600°	2.5

Properties of Zirconium Silicate, developed by over 30 years of TAM research, find large scale usage in a range of applications. Increasing tonnages are used in the manufacture of dry process and porcelain enamel frits. For opacification and craze resistance of ceramic glazes, $ZrSiO_4$ also finds volume application. It is used extensively in acid and electrical resisting cements and in the manufacture of high temperature and special refractories. Its high mechanical strength and thermal shock resistance make it ideal as a body constituent in certain electrical porcelains. As a mold and core wash ingredient and as a mold material in precision alloy castings and kiln furnace coatings, there is a mounting demand for Zirconium Silicate.

TAM

TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 Broadway, New York City *General Offices and Works:* Niagara Falls, N. Y.



stop cracking during curing

get top mechanical strength

use No. 5016 **PLYOPHEN** for heavy wall tubing

Fabricators report that this phenol-base varnish scores excellent on every point in the production of thick-walled laminated tubing. It assures minimum cracking during curing. It confers maximum mechanical strength and high water resistance. And, like all Plyophens, it is a carefully standardized product, thus assuring exact results on every production run. It's fine for flat sheet stock as well, when only average electrical properties are needed. Send for a working sample direct to the Sales Department at Detroit.

SEE OUR EXHIBIT PACIFIC CHEMICAL EXPOSITION SAN FRANCISCO CIVIC AUDITORIUM OCTOBER 21–25, INC. 1946

REICHHOLD CHEMICALS, INC.

RCI

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Seattle, Washington • Tuscaloosa, Alabama
Liverpool, England • Paris, France • Sydney, Australia • Zurich, Switzerland • Milan, Italy • Rio de Janeiro, Brazil

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

BAKER & ADAMSON *Announces*

Another Advancement in Packaging

B&A HYDROFLUORIC ACID, *Reagent A.C.S.*

Exclusive *SAFTEPAK*† PLASTIC BOTTLE
maximum utility • maximum safety

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882
B&A
STANDARD OF PURITY
ACID HYDROFLUORIC
Reagent 48% Code 1100
GENERAL CHEMICAL COMPANY
NEW YORK, N. Y., U. S. A.

Two years ago, Baker & Adamson pioneered plastic containers for its Reagent A. C. S. Hydrofluoric Acid. Thus, it eliminated for all time the hazardous old-fashioned wax bottle for HF so long in use by the chemical industry. This package met with immediate success and widespread acceptance, for it answered a long-felt need of laboratory chemists.

Now, with new advancements in plastics themselves, Baker & Adamson has developed a still finer container—its exclusive new *Saftepak* bottle. This offers the combination of special pouring and sealing features outlined, which provide maximum utility and protection in laboratory use. Study them carefully, then order your Reagent HF requirements from B&A today . . . and be among the first to enjoy the advantages of the exclusive *Saftepak*. It is readily available from convenient shipping points, coast to coast.

† Trade Mark, General Chemical Co.

1 Outstanding Pouring Control

Now pours drops, needle stream, or full flow, depending on your requirements.

Accurate measure . . . "siphon-action" pour-out draws back into bottle any drops clinging to lip when pouring stops.

Translucent . . . acid level always visible.

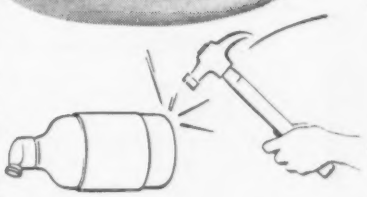
Easy to handle . . . the *Saftepak* with its sturdy encircling label band fits conveniently into your hand for easy pouring.

2 Acid Resistant

Entire unit made of special plastic highly resistant to aqueous HF.

3 Shatter-Proof

Bottle is pressure molded of shatter-proof plastic . . . does not become brittle, crack or break as do ordinary wax containers. Will not shatter or smash even under heavy impact.



4 Screw-Tight Cap

Provides easy reclosure; safeguards against possible spillage or leakage; protects Reagent A. C. S. purity of the acid.

REAGENTS
B&A — BAKER & ADAMSON — QUALITY
STANDARD OF PURITY
FINE CHEMICALS

GENERAL CHEMICAL COMPANY

BAKER & ADAMSON DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Albany* • Atlanta • Baltimore • Birmingham* • Boston* • Bridgeport Buffalo* • Charlotte* • Chicago* • Cleveland* • Denver* • Detroit* • Houston • Kansas City Los Angeles* • Minneapolis • New York* • Philadelphia* • Pittsburgh* • Portland (Ore.) • Providence* St. Louis* • San Francisco* • Seattle • Wenatchee (Wash.) • Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal* • Toronto* • Vancouver*

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

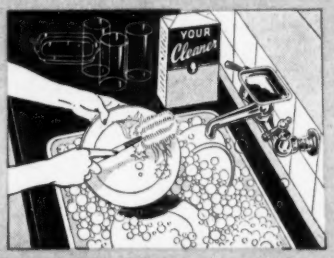
* Complete stocks carried here.

FOR YOUR INFORMATION

now available to help you clean up

Santomerse No. 1

the modern, all-purpose detergent and wetting agent



Santomerse No. 1 in bead form is ready for packaging and sale as a household cleaner with no further processing or compounding. A tablespoon to a dishpan of water forms plentiful suds instantly, cleans thoroughly, rinses quickly and easily, leaves glassware sparkling clean without toweling.

Increased facilities for the production of Santomerse No. 1 assure a plentiful supply of this modern, all-purpose detergent and wetting agent. Two forms of Santomerse No. 1 can be supplied — flake form, used extensively by industry for a multitude of cleaning jobs; bead form, which is better suited for household application . . . Quick facts about Santomerse No. 1 and a partial list of suggested cleaning applications are tabulated here.

Some Typical Opportunities for Cleaning Up with Santomerse No. 1

Fruit and vegetable washing
Automobile cleaning
Dairy equipment cleaning
Dishwashing
Dry cleaning
Glass cleaning
Household cleaners
Commercial laundries
Household laundries
Milk bottle cleaning
Painted surface cleaning
Railroad car cleaning
Rug cleaner
Wall cleaner
Bubble Bath preparations
Fur processing
Leather processing
Metal cleaning
Cold water paint manufacture
Paper manufacture
Paper stock de-inking
Cotton dyeing, bleaching and finishing
Rayon dyeing, bleaching and finishing
Silk dyeing, bleaching and finishing
Nylon dyeing, bleaching and finishing
Jute, straw, hair and feather processing
Wool processing
Wallpaper remover

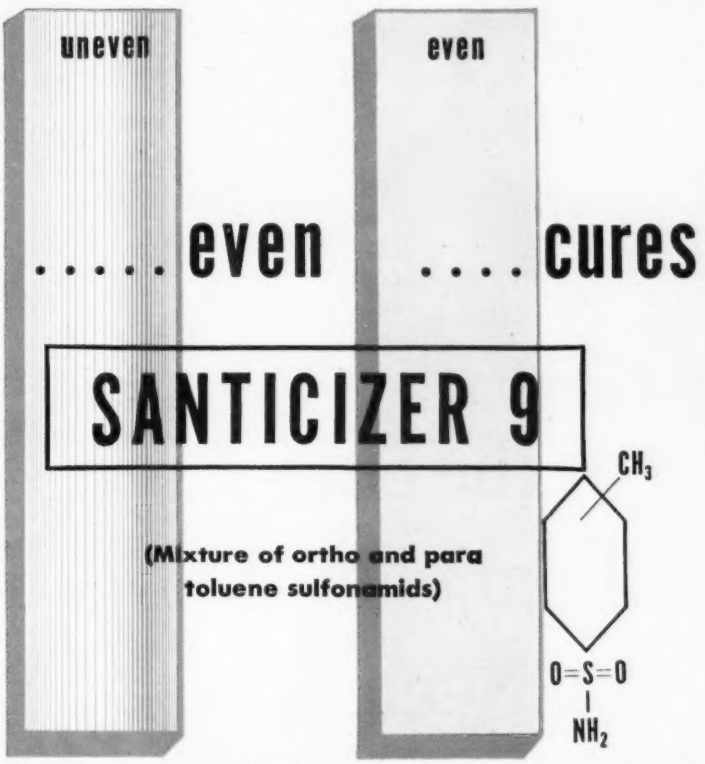
Quick Facts about Santomerse No. 1

1. Combines cleaning action, wetting, dispersing, emulsifying, penetrating — all in the one product.
2. Speeds and improves cleaning by first making water wetter so that it spreads faster and penetrates deeper.
3. Quickly separates and removes imbedded or attached soil, breaks it up and keeps it in suspension so it cannot be re-deposited.
4. Functions effectively in hard or soft water . . . in acid or alkaline . . . hot or cold solutions.
5. Produces instant lather or foam in water solutions under all conditions.
6. Can be used alone or in combination with other materials such as alkaline builders.
7. Prevents formation of insoluble curds in hard water.

Get Complete Facts About Santomerse No. 1

Send for your copy of this new 28-page booklet containing full technical details and valuable application data on Santomerse No. 1. Write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1703 South Second Street, St. Louis 4, Missouri.

Santomerse: Reg. U. S. Pat. Off.



Since it is compatible with thermal setting resins, Monsanto's Santicizer 9 is especially indicated where even cures are desirable—where fibers or fibrous materials are to be impregnated under heat and pressure—where difficult and complicated molding operations are contemplated.

When added to phenolics or ureas, Santicizer 9 improves flow without materially affecting the curing time, and decreases brittleness of the ultimate product.

These properties suggest the application of Santicizer 9 to laminated phenolics and ureas based on paper or cloth and hemp or sisal-filled products.

Trial lots, samples, additional data and technical assistance are available on Santicizer 9. Contact MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1703 South Second Street, St. Louis 4, Missouri.

SEND FOR SAMPLES OF THESE MONSANTO PLASTICIZERS

Santicizer* 3, Santicizer 8, Santicizer 9, Santolite* MS (80%), Santolite MHP, Santolite K5H, Aroclors,* Dibutyl Phthalate, Diethyl Phthalate, Dimethyl Phthalate, Diphenyl Phthalate, HB-40, Ortho-Nitrobiphenyl, Santicizer 1-H, Santicizer B-16, Santicizer E-15, Santicizer M-17, Santicizer 140, Triphenyl Phosphate, Tricresyl Phosphate.

LUSTREX

Improved Heat-Resistant Polystyrene

Monsanto's recently announced Lustrex opens up an entirely new group of uses for plastics — permits them to be immersed in boiling water . . . Color possibilities are almost unlimited . . . Usually can be molded in cycles up to 30% faster than required for ordinary polystyrene.

Facts about Lustrex: Injection molding temp. 350°-620° F. Molding pressure p.s.i. 10,000 and up. Sp. gr., 1.05. Flexural strength, p.s.i. 1200-14,000. Flexural deflection, inches, 0.15-0.25. Impact strength, ft. lbs. per inch (unnotched) 3.2-3.6. Heat distortion temp. °C. (Air bath) 87-88½. Dielectric constant, 1 megacycle, 2.5-2.7. Power factor, 1 megacycle, 0.0001-0.0005. Water absorption, % (24 hrs.) 0.04-0.05.

Available in commercial quantities . . . Address Monsanto Chemical Company, Plastics Division, Springfield 2, Massachusetts.

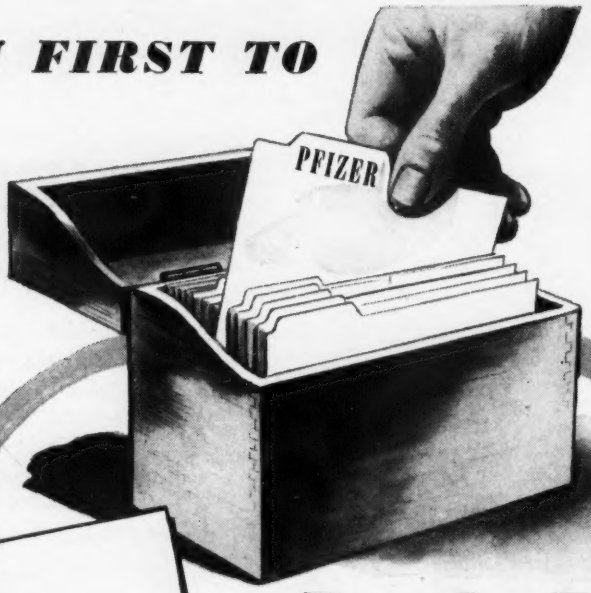
*Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY, 1703 South Second Street, St. Louis 4, Missouri. District Sales Offices: New York, Philadelphia, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Houston, Los Angeles, San Francisco, Seattle. In Canada: Monsanto (Canada) Limited, Montreal.

TURN FIRST TO PFIZER



PFIZER VITAMINS

Ascorbic Acid
Riboflavin
Thiamine Hydrochloride
Niacin and Niacinamide
Calcium Pantothenate
Pyridoxine Hydrochloride

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Now entirely free from Government control, these Quinine salts are available for the manufacture of proprietary products, cold tablets, chill tonics, industrial and other products, as well as for antimalarial therapy.

Cinchonine and Cinchonidine in the form of alkaloid and usual salts, as well as minor Quinine salts, will be available shortly thereafter. It is expected that Quinidine Alkaloid and Sulfate will continue in short supply and hence remain under allocation.

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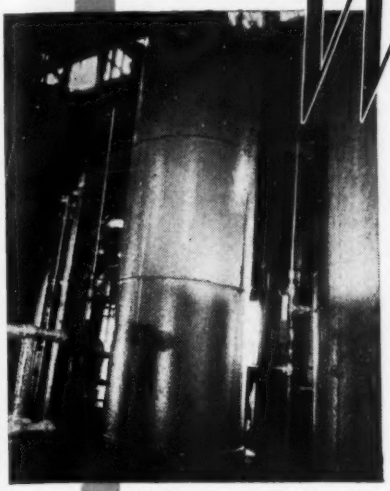

Chlorinating towers like these are important factors in the production of Hooker Chlortoluenes

WHERE chlortoluenes are involved in your reactions, you can be sure of high purity by selecting them from Hooker chlortoluene compounds and derivatives. Using selected raw materials of high purity and high quality chlorine, Hooker is able to offer you chlortoluenes and chlortoluene derivatives of exceptionally high purity. Because Hooker has available a number of different chemicals with the same reactive radicals, you are not limited in your choice but can pick the intermediate that best meets your needs from the standpoint of chemical activity, purity, ease of handling and costs.

Listed below are a few of these chlortoluene derivatives—a good source for the benzyl, benzal and benzoyl groups as well as others. Technical Data Sheets on each and samples are available when requested on your business letterhead. Bulletin 320, also available on request, gives some of the reactions of Hooker chlortoluenes.

PRODUCT	FORMULA	DESCRIPTION	REACTIONS
Monochlortoluene	$CH_3C_6H_4Cl$	Clear, colorless to straw colored liquid. A mixture of ortho and para isomers.	Reacts to form chlorbenzyl, chlorbenzal, chlorbenzenyl, and chlorbenzoyl compounds.
Benzyl Chloride	$C_6H_5CH_2Cl$	Clear, colorless to light yellow liquid.	Source of benzyl group. In Friedel-Crafts reactions. For production of mixed ethers, esters. Reacts with alcohols, anilines, sodium cyanide, sodium sulfhydrate, sodium sulfide.
Benzoyl Chloride	C_6H_5COCl	Clear, colorless liquid.	To introduce benzoyl group into organic compounds. Reacts with alcohol to form esters. To form ketones in Friedel-Crafts reactions. Reacts with ammonia, amines and benzene.
Benzoic Acid	C_6H_5COOH	White crystalline solid in powdered form.	As a source of the benzoyl group.
Benzoate of Soda	C_6H_5COONa	White crystalline solid in flake or powdered form.	As a source of the benzoyl group.

OTHER HOOKER CHLORTOLUENE DERIVATIVES

Benzal Chloride **Benzoic Anhydride** **Benzotrichloride**

Benzyl Alcohol **Benzyl Thiocyanate**

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HOOKER ELECTROCHEMICAL COMPANY

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7-486

ANNOUNCING

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Another Halogen Fluoride produced by Harshaw

CHLORINE TRIFLUORIDE, perhaps the most reactive chemical compound ever made, is the latest addition to the Harshaw Fluoride Line and takes its place beside Bromine Trifluoride as another Halogen Fluoride made available to industry by Harshaw. "That stuff is just fluorine which has been tricked into staying liquid," commented a visiting chemist after reviewing our accumulated information on Chlorine Trifluoride.

Chlorine Trifluoride does show so many of the reactions of fluorine, such as those listed above, that often it is a very acceptable alternate to the element itself. It constitutes a very valuable supplement to the fluorine cells in laboratories and pilot plants conducting investigations in fluorine chemistry. It is a great aid in the elimination of delays imposed on experimental schedules by limited fluorine generation capacity.

The use of Chlorine Trifluoride is so simple—just a cylinder containing a volatile liquid gives you the reactivity of fluorine held under perfect control. Where the reactive properties of fluorine in a very slightly modified form are desired, Chlorine Trifluoride is the answer.

CHEMICAL PROPERTIES

1. Converts CoF_2 to CoF_3
2. Converts AgCl or AgF to AgF_2
3. Reacts vigorously with water, organic materials, hydrogen, sulfur dioxide and a vast number of other elements and compounds.

PHYSICAL PROPERTIES

1. Boiling point . . . . . 11.3°C
2. Freezing point . . . . —83°C
3. Density . . . . . 1.8 g/ml

OTHER HARSHAW FLUORINATING AGENTS

Antimony Trifluoride, Anhydrous
Argentic Fluoride
Argentous Fluoride
Bromine Trifluoride
Cobaltic Fluoride
Hydrogen Fluoride, Anhydrous
Manganic Fluoride
Mercuric Fluoride
Potassium Fluoride, Anhydrous
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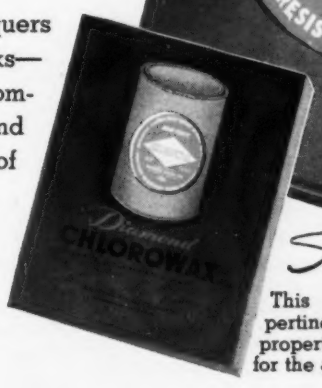

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Carbon Tetrachloride	Rochelle Salt	Tartar Emetic
Caustic Soda	Silicon Tetrachloride	Tartaric Acid
Chlorine	Sodium Hydrosulphide	Titanium Tetrachloride
Citric Acid	Stripper, Textile	

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Chemical Industries

THE MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

For Your Information:

Newsletter.
October 1, 1947

Within a matter of a few months continuous desizing of textiles will reach production status. Mills, both here and in Canada, that have tried out the process in cooperation with Rohm & Haas Co. are held up only by the slow delivery of equipment. Secret of the development: a heat-resistant enzyme which desizes faster as the temperature is raised, permits continuous rather than batchwise operation.

Surface active ether esters, pushed by Atlas Powder Co. since wartime chiefly as emulsifiers, will take on a new job in 1948. A major soap concern has recently standardized on one of these materials as the base for a new synthetic detergent it will promote early next year.

* * * * *

Corn Products Refining Co. is currently excited about a new starch, soluble in cold water, which it has developed and is quietly test marketing in South Bend, Indiana. It is now in the pilot plant, but plans have already been completed for construction of a full-scale commercial unit. The South Bend trials, where the product is being sold as a retail item under the brand name of Niagara starch (19¢ for a 12. oz. package), are but the first step. As soon as output is boosted Corn Products will broaden distribution, will also set out to cultivate industrial consumers: e. g., paper mills, textile concerns, etc.

Although Monsanto Chemical Co. has long recovered maleic anhydride as a by-product of its phthalic operations, it will soon materially augment its interest in the former chemical. Now under construction is a large unit which will be devoted exclusively to maleic manufacture, will probably come into operation early next year. Main immediate uses: alkyd resins.

Also on the Monsanto docket: construction of several new plants to make a new type of phosphate plasticizer for vinyls. It is not anticipated, however, that production from these proposed projects will be realized for something of the order of 18 months to two years.

* * * * *

A novel method of reprocessing stems and other parts of the tobacco leaf formerly discarded from cigarette tobaccos is being developed by the American Machine & Foundry Co. The scrap is colloidalized and sheeted to make an artificial "leaf" the natural cellulose serving as a binder. In preliminary tests up to 15 per cent of the reprocessed leaf has been used in cigarettes, without detection by experts.

Dow Corning Corp., the Dow Chemical Co.-Corning Glass Works enterprise set up to develop silicones, is embarking on a program to sell a line of silicone-derived products in the retail field. First to reach the market are kitchen pot-holders (made of Silastic) and eyeglass wipers. Both items are being introduced in the Chicago area through Marshall Field & Co. Merchandising plans for other household items now in the works are being deferred pending outcome of the Chicago trials.

Shell Chemical Co. is currently eyeing the commercial possibilities of 1-amino-2-methyl-2-propanol. Main field to be investigated: emulsion paints. Incidentally, Shell has ordered thirty-six (8000-gal.) aluminum tank cars for the transportation of the synthetic glycerine it is planning to produce.

A recently formed concern, Up-State Chemical Co., Newark, has begun the manufacture of an amine condensation detergent, is marketing it under the tradename KF-100. In addition the company is turning out degreasing compounds and shampoo bases, will soon enter the paste and no-rub wax field. Main emphasis will be placed on the manufacture of specialties for re-packaging.

* * * * *

An attempt is being made to revive the Kosciusko Island, Alaska, limestone project which was abandoned earlier this year by the Aluminum Co. of America. Original plans called for opening a large quarry to supply high grade limestone to industries in the Pacific Northwest. Several interested parties are now trying to form a syndicate to go in with, or take over from, Alcoa.

There won't be an official announcement for several months, but one of the major manufacturers of brushes (which has just completed a casein bristle development) is planning to introduce a line of chemical specialties -- paint brush cleaners and kindred items.

* * * * *

Here and There:

Both Socony-Vacuum Oil Co. and Standard Oil Development Co. were recently granted patents covering the production of chlorine by a variant of the old Deacon process ... General Mills is pilot-planting allyl starch and distributing experimental quantities. Particular attention is being paid to the protective coatings field ... Sodium carboxymethylcellulose is being turned out on a pilot plant scale by Wyandotte Chemicals Corp. At present, production and sales efforts are being confined to the technical, rather than food, grades ... A liquid starch, containing bluing, scented, and claimed to be "non-sticking" is being test marketed in Columbus, Ohio by American Maize Products. The trial will be carried along for several months and no decision re national distribution will be made until the results can be appraised ... Standard Chemical Co. Ltd., Toronto, is weighing ethylene oxide possibilities, will probably build a producing unit at Montreal in conjunction with an independent petroleum refiner ... An Antu-containing rodenticide will be introduced in the relatively near future by Boyle-Midway, Inc., the chemical specialty division of American Home Products Corp. ... The Du Pont Company is building an acetic anhydride unit at La Porte, Texas. Output will be consumed by the company for rayon production ... New facilities are planned by Oronite Chemical Co. which will double the firm's output of phthalic anhydride. Completion of construction is scheduled for the first half of 1948.

The Editors

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CHEMICALS

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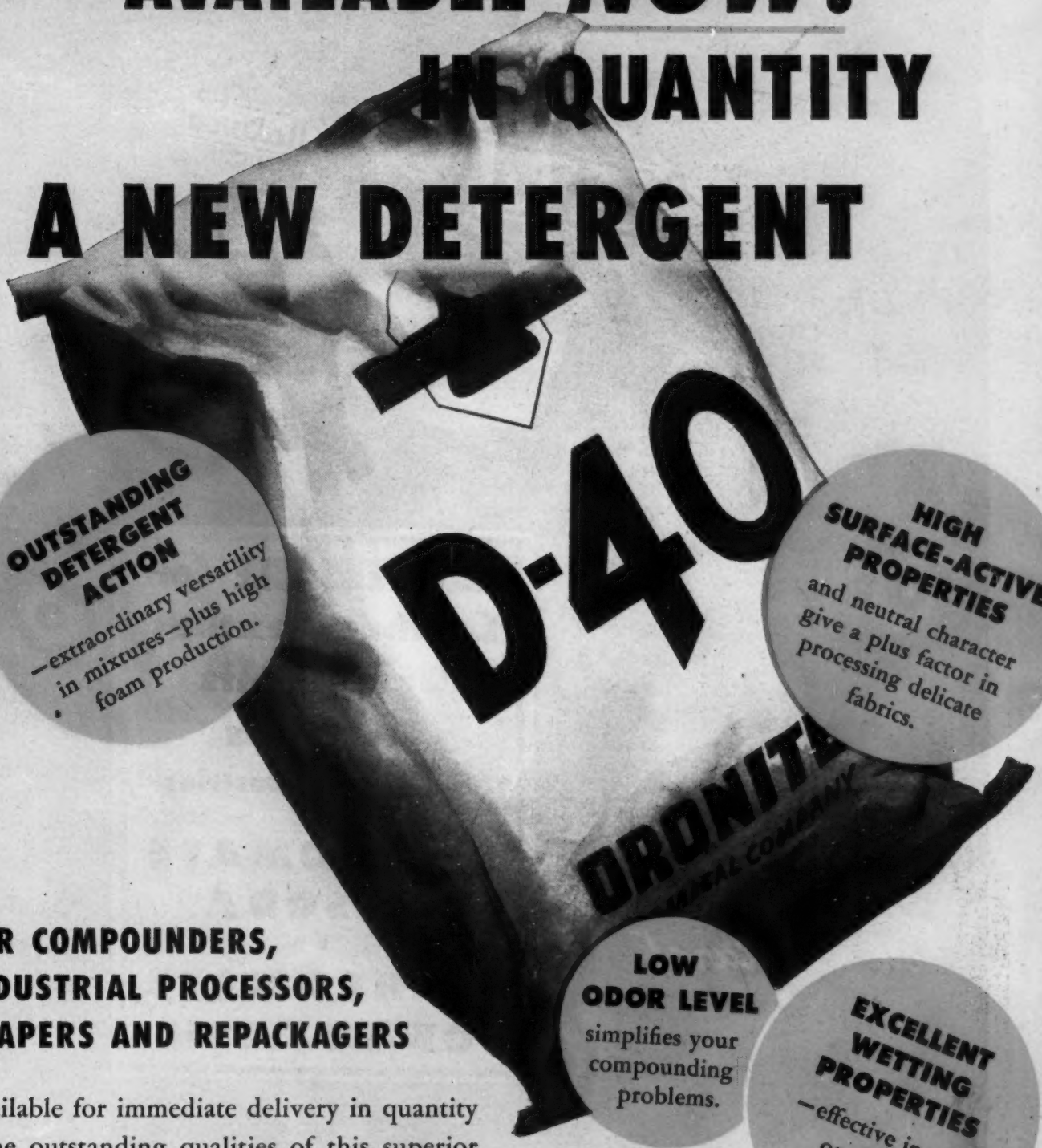
THE NAME TO WATCH IN CHEMICALS

AVAILABLE *NOW!*

IN QUANTITY

A NEW DETERGENT



OUTSTANDING DETERGENT ACTION
—extraordinary versatility in mixtures—plus high foam production.

HIGH SURFACE-ACTIVE PROPERTIES
and neutral character give a plus factor in processing delicate fabrics.

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simplifies your compounding problems.

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Available for immediate delivery in quantity —the outstanding qualities of this superior detergent make it a top choice in the compounding, textile processing and in the industrial cleaning fields.

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INDISPENSABLE for
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Dyes - Paints
Chemicals
and other Industries

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BICHROMATE OF SODA

•

BICHROMATE OF POTASH

NATURAL PRODUCTS REFINING CO.

JERSEY CITY, NEW JERSEY

Editorial CI

QUALITY WITH QUALIFICATIONS

by ROBERT L. TAYLOR, Editor

Upon returning recently from a tour of Europe, in which he was interested in studying at first hand some of the causes and effects of the present economic difficulties there, a Washington government official told of a conversation he had with an English manufacturer.

The Englishman said that America was beating England out all over the Continent in the current competition for markets. "Take padlocks," he said, "You are outselling us terribly on padlocks. Yet our padlocks are better than yours. The trouble is, while our padlocks will outlast yours by a good margin, yours will last as long as the purchasers want them to last."

QUALITY HAS LONG BEEN A CORNERSTONE of the American chemical industry. Many of our leading chemical companies today got their start by establishing over a period of time a spotless reputation as small but dependable suppliers of quality chemicals. Ever since the early years of this century, when it was the popular impression that the Germans were the only ones who knew how to make good chemicals, there has been great stress in all quarters of the American industry on quality.

And the policy has paid off. There is little doubt that in the early days, at least, the collective reputations of individual chemical companies for quality and dependability of their products was a major factor in the rapid acceptance of new chemicals and the tremendous growth of the industry. Up until 20 years or so ago, few buyers of chemicals had much assurance over and above the word and reputation of the seller that they were getting good quality materials. Fewer still had the faintest idea of what to do if the chemicals did not perform as expected. The natural and inevitable reaction to poor results was to assume that some of the materials were no good in the first place.

So the maker of chemicals could take no chances. He had to produce the best product he could and still keep his price competitive.

Without implying that American chemical manufacturers are anywhere near the plight of the English locksmiths, or that product standards should in any way be lowered where quality is essential, it is worth pointing out in these times that even quality can be overdone.

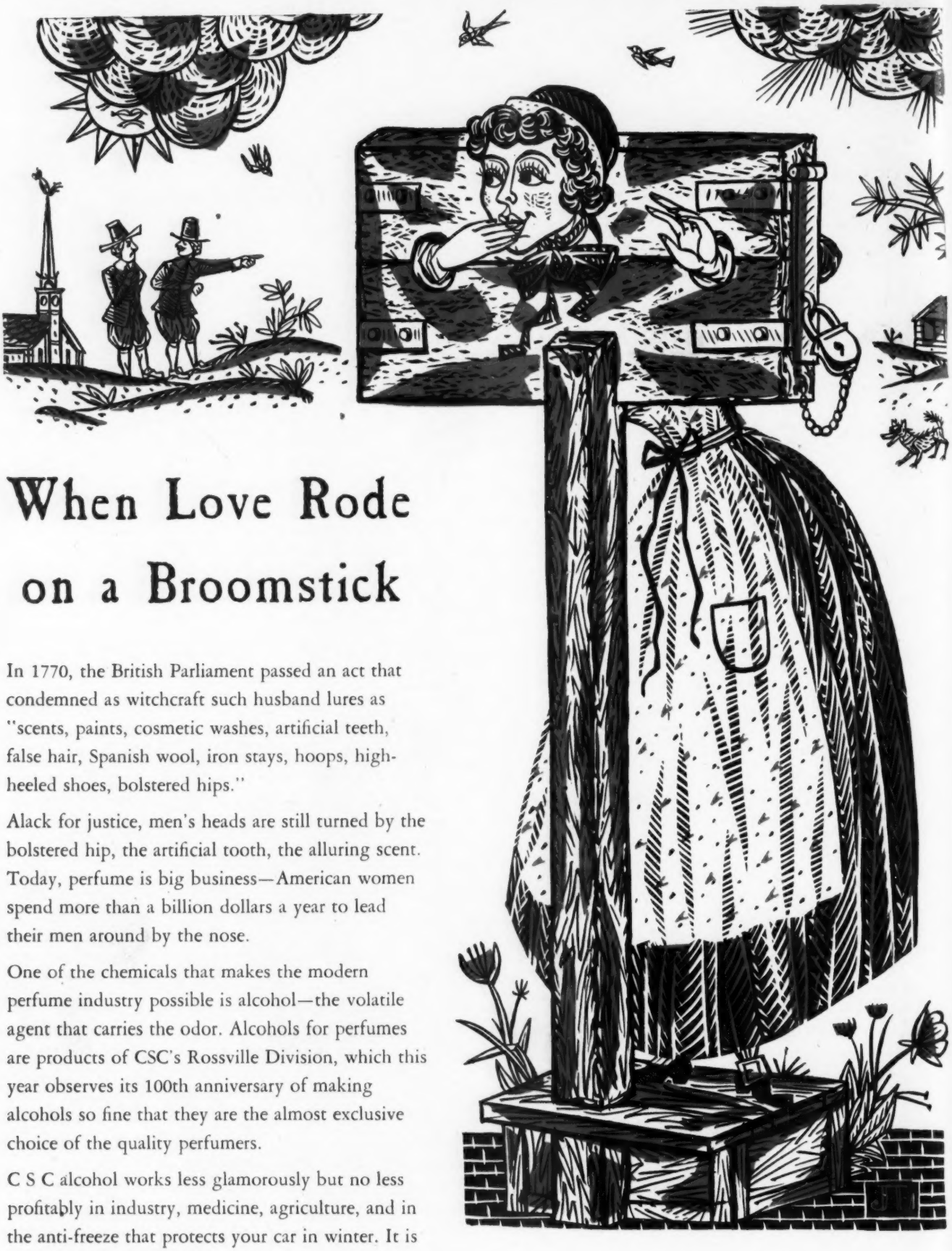
It does not benefit a customer to sell him a high purity material at a premium price when a technical grade would serve his purpose just as well, even though he may be perfectly happy paying the higher price. A product is good or bad only in relation to what is expected of it. Overselling of anything, including quality, is poor policy in the long run.

This is particularly true in view of the changing character of the buyers of chemicals. No longer does the customer need to rely entirely on the word of the supplier to know what he is getting or what he should get. Chemical users are employing their own chemists and their own laboratories. They are not content merely to know that a material will work. They want to know whether it will work better than something else, whether something cheaper may not do as well. They are taking steps to find these things out for themselves, and the supplier of chemicals who designs his selling efforts to help them do it will find himself in a stronger position when the pinch comes than one who is merely offering quality.

Quality with qualifications applies to other phases of the chemical business, too.

Buying unneeded quality can frequently be even more costly than selling it. Chemical companies who are looking for ways to combat mounting costs may find it worth while to review their raw materials set-up for possible places where a crude material might be used more economically than a refined grade, or where a premium being paid for good color, good odor or other special characteristic may be of doubtful value.

Quality, as the English lock makers are finding out, is costly and, like all costs, must eventually earn its keep, whether you are on the buying side or the selling side of the fence.



When Love Rode on a Broomstick

In 1770, the British Parliament passed an act that condemned as witchcraft such husband lures as "scents, paints, cosmetic washes, artificial teeth, false hair, Spanish wool, iron stays, hoops, high-heeled shoes, bolstered hips."

Alack for justice, men's heads are still turned by the bolstered hip, the artificial tooth, the alluring scent. Today, perfume is big business—American women spend more than a billion dollars a year to lead their men around by the nose.

One of the chemicals that makes the modern perfume industry possible is alcohol—the volatile agent that carries the odor. Alcohols for perfumes are products of CSC's Rossville Division, which this year observes its 100th anniversary of making alcohols so fine that they are the almost exclusive choice of the quality perfumers.

C S C alcohol works less glamorously but no less profitably in industry, medicine, agriculture, and in the anti-freeze that protects your car in winter. It is one of more than 200 chemicals produced by C S C.

CSC COMMERCIAL SOLVENTS CORPORATION, 17 EAST 42ND STREET, NEW YORK 17, N. Y.

What's new

NO RESPITE FOR ALKALIS

New alkali capacity added in 1947 and 1948 is expected to amount to 12 per cent for soda ash, 20 per cent for caustic soda, but producers admit it still may not be enough.

THE ALKALI INDUSTRY has always been happiest when it is operating at around 80 to 85 per cent of capactiy. This gives it necessary down-time for maintenance, as well as a little slack for the inevitable peaks and valleys of demand.

Not for at least five years, however, has the the pressure let up sufficiently for producers of soda ash and caustic to get more than a fleeting glimpse of anything that approached this pleasant state of their affairs; and some of them now feel that it will be an agreeable surprise if they reach such a point in the next five years. Even if they have allowed themselves some leeway, even if that point is reached in less time—the general consensus, i.e., that demand for alkalis—particularly soda ash—will be crowding production for some time to come, does seem to have some substantial basis.

Soda Ash the Toughest

In the case of soda ash, this basis is comprised principally of three things: (1) the total absence of any expansion of capacity east of the Rockies during the war, (2) the relatively small indicated expansion since the war, and (3) evidence of a sizeable deferred demand by users of alkalis.

In considering the soda ash production picture for the country, it is necessary to keep in mind the geographical limits imposed on producers by high transportation costs in relation to the value of their product. Thus in normal times that part of the country west of the Rockies is served entirely by natural soda ash occurring in California and certain other western states, while the Middle West, South and East are dependent on Solvay-process ash.

With recent increases in freight rates there has been an even greater tendency for producers to draw in the boundaries of their marketing areas, so it can be expected that the industry will become even more localized in the future. As an example, the latest hike in freight rates found some producers faced with freight equalization costs to outlying customers amounting to as much as 20 per cent of the price of the soda ash. No synthetic producer is in a position to absorb freight charges of this magnitude. The situation is further having the effect, as has been evident for some time, of causing the alkali companies to diversify their operations and add other higher-profit lines of alkali-derived products.

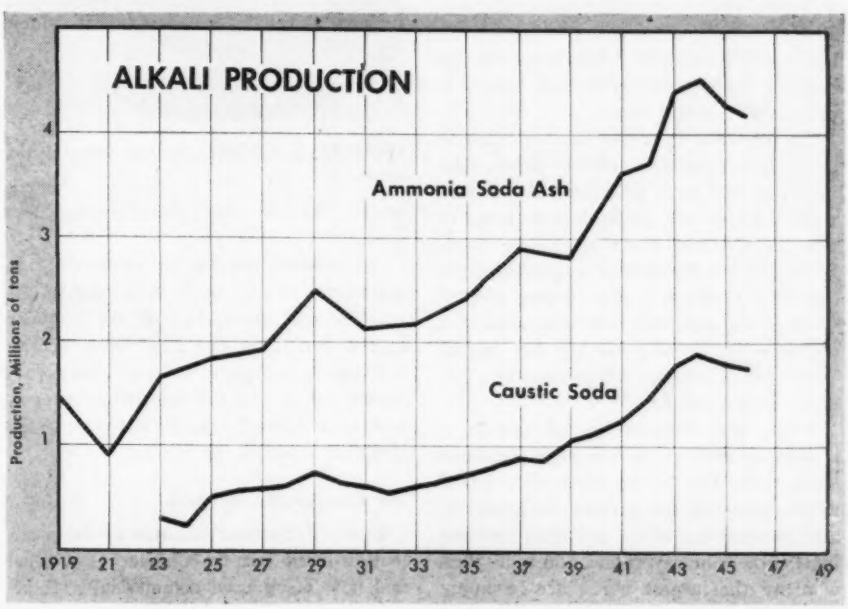
Five Out of Six Increasing

There are six soda ash producers east of the Rockies: Columbia Chemicals Division of Pittsburgh Plate Glass Co., Diamond Alkali Co., Mathieson Alkali Works, Solvay Process Co., Southern Alkali Co., and Wyandotte Chemicals Corp. Of these, all but Diamond have expansions under way which will raise the estimated ash capacity of the group from 12,500 tons per day at the end of 1946 to 14,000 tons per day by the end of 1948, or an increase of 12 per cent.

This will of course be all to the good. But if one projects into the next few years the average rate of growth of soda ash consumption over the past 25 years, he learns a rather disturbing thing: this projection of demand reaches 14,000 tons per day by 1950, or just one year later than the arrival of capacity at the same point.

This is not very much leeway. It is even less when it is considered that the projection of demand is on the basis of a 25-year average. There are some good indications that actual demand over the next few years may go ahead at a rate greater than this average. For example, there is still some use of wartime soda ash substitutes such as cullet and salt cake that must be absorbed. While most glass makers have cut down on their use of cullet, all of them have not yet gone as far as they would like to. Too, there are still some effects of the war-to-peace transition that have not been felt fully, such as the reëstablishment of non-returnable beer bottles on their prewar scale.

The greatest step-ups in demand, however, are expected to come from deferred expansion programs in the glass and chemical industries, which together account for about 80 per cent of total soda ash consumption. Some of these programs have been specifically held back until the new ash facilities come into production. Increases in plate and window glass particularly, as well as other types of architectural glass, are expected to be a sizeable factor. While not nearly as large, the glass fiber field is anticipating substantial percentage gains in the use of



its product for insulation and in glass fabrics. In the chemical field, many of the new postwar products are requiring alkalis in their manufacture. Soap and detergents, pulp and paper, water softeners, and non-ferrous metals refining—all important users of soda ash—are expected to maintain their present requirements, and some are showing signs of increased needs.

In this discussion we have not specifically considered the western natural ash producers. These producers, which comprise the American Potash & Chemical Corp., Natural Soda Products Co. (affiliated with Wyandotte Chemicals Corp.), Pacific Alkali Co. (affiliated with Pittsburgh Plate Glass Corp.), and West End Chemical Corp., all of California, increased their production facilities during the war, and this year a new natural ash deposit was opened up and is being worked near Rock Springs, Wyoming, by Westvaco Chlorine Products Corp. At the present time, the ash situation is considerably easier on the West Coast than in the East. It is not likely, however, that eastern consumers will want to draw on western ash to any large degree, even if it is available, because of the high cost of the long freight haul.

Caustic Better

The outlook for a more plentiful supply of caustic soda is not nearly so gloomy as for soda ash, despite the fact that in many areas caustic has been harder to get recently than ash.

There was some expansion of caustic production during the war, and according to a detailed study worked up by one producer, additional projects that have or will come in during 1947 and 1948 are expected to raise the total capacity for the country (on a 75% NaOH basis) from 6,200 tons per day to 7,500 tons per day, or about 20 per cent. The major part of this increase will be by the electrolytic process and will be participated in by Columbia, Diamond, Dow, Hooker, Pennsylvania Salt, Solvay, Southern Alkali, and Wyandotte. Mathieson is increasing its production by the lime-soda process at Saltville, Va.

Of the 1300 tons per day increase in electrolytic caustic, a sizeable chunk, estimated at 660 tons, will be in the Southwest. There are some in the industry who are doubtful about the ability of the Southwest to absorb this much additional caustic. If these doubts prove correct, some of the material from that area will undoubtedly be shipped to the Middle West and Southeast, where shortages are likely to last longer.

While the consumption of caustic is largely geared to the general business level, there are yet no signs of a let-up in the pressure for greater deliveries in almost every one of the principal consuming fields. The rayon and film industries, who are the largest users, are resuming an upward trend that was slowed temporarily earlier this year. Continued increase in the needs of both of these industries appears to be almost a certainty. Likewise the detergent, pulp and paper, and petroleum-refining fields appear not yet to have reached their postwar peaks.

Thus the general outlook in the case of both soda ash and caustic is for a steadily increasing domestic demand—not to mention foreign, if the dollar problem can be overcome. If 1948 is another boom year, shortages in both of these basic materials are likely to be acute. If it is a recession year, or anything short of a major depression, the likelihood is for a supply situation that is little more than in comfortable balance with demand.

FATTY ACID DOUBLET

Dimerization of polyunsaturated fatty acids gives potentially useful compounds, also provides purification of monounsaturates.

COMMERCIAL oleic acid contains 8 to 15 per cent of more highly unsaturated acids, and sometimes it would be a lot better if they weren't there. They often worsen the color and lower resistance to oxidation.

CHARLES G. GOEBEL: He officiates at the union.

An obvious method of removal is to polymerize these acids and distill the purified acid away, leaving the polymer in the pot. This has been done before, but heat polymerization was always accompanied by a great deal of decomposition and loss of acidity, destroying the chemical value of the residue.

An Inexpensive Reagent

Emery Industries' solution to the problem, worked out by Charles G. Goebel and now being used commercially, is almost foolishly simple: just carry out the polymerization in the presence of water, which, by some imperfectly understood mechanism, prevents decarboxylation of the acid. No other inert atmosphere or diluent works; only water does the trick.

In Emery's process the acid is heated at 330°-360° C. for 3 to 8 hours under 85 to 400 lbs. steam pressure, after which the reaction mixture is dried and distilled. The distillate (about 85 per cent by weight) is purified oleic acid, containing less than 3 per cent of linoleic acid.

"Doublinoleic" Acid

The oleic acid is fine; but the "gunk" left in the still pot is interesting too. Previous workers had carried out similar experiments, had learned that the residue was largely a dimer of linoleic acid. Two molecules of the acid are joined, like Siamese twins, halfway down the backbone. What happens is this: A molecule isomerizes to give a conjugated double-bond system; it then adds to another molecule (by 1,4-diene addition) to give a substituted cyclohexene, a double linoleic acid, which undergoes the usual fatty acid reactions plus those of dibasic acids. Some trimers are also present.

In order to get large quantities of this dimer, it is fruitless, of course, to start with commercial oleic acid. It is more sensible to start with fatty acids containing a fairly high proportion of linoleic acid. E. R. Baker, director of development at Emery, says, "It is prepared by the heat polymerization of the fatty acids of semi-drying oils such as cottonseed, soya, or corn oil. Although known previously, our present method of production is radically different from that used heretofore and results in a much purer and lighter product."

What It's Good For

The linoleic dimer, being a dibasic acid, is interesting for those applications in which dibasic acids have been found useful: as a modifying dibasic acid in alkyd resins, in polyamides, polyesters and metallic soaps. Such derivatives are useful as petroleum additives, emulsifying agents, adhesives and shellac substitutes. Polyamides have been prepared, using hexamethylene diamine, with molecular weights of 28,000 to 29,000. Standard Oil Co. (Indiana) has several patents on dimer acid-glycol polyesters for use as oil additives.

In the Offing

At least one use has gotten beyond the anticipatory stage. A Midwestern firm is manufacturing a dilinoleic acid-ethylene diamine polyamide used in paper coatings.

Emery has a hunch that linoleic dimer is going far: right now it is available in drums, but by June, if things work out as expected, tank-cars of it will be leaving the yards.

HULSE and VANDENBERG: They work at tree temperature.

COLD RUBBER

A new catalyst, cumene hydroperoxide, is expected to provide better, cheaper synthetic rubber.

THERE'S a lot of interest among rubber men in low-temperature polymerization. Last spring Phillips Petroleum Co. announced a new low-temperature process for styrene-butadiene rubber; G. G. Oberfell, vice-president in charge of research, said it depended on "a novel combination of chemical ingredients, including catalytic initiator systems, employed in the polymerization recipes." Then last month news of a low-temperature solvent, for emulsion polymerization of isobutylene-butadiene rubber at —70° C. and below, was received from chemists of Purdue University and Battelle Memorial Institute. The solvent—more properly, a dispersing medium—is a liquid fluorocarbon.

Nature Doesn't Use Heat

Latest aid to low-temperature work is cumene hydroperoxide, a new catalyst now in the pilot plant at Hercules Powder Co. This chemical, according to E. J. Vandenberg and G. E. Hulse, enables manufacture of rubber at 40° F. Or at the usual processing temperature (122° F.) it cuts polymerization time to a sixteenth of that normally required.

Early Promise

A cogent argument supports the new emphasis on low-temperature processing: synthetic rubber just doesn't have the stretch and snap-back of natural rubber. As a result, synthetic tires—especially under heavy loads—generate heat, become weak, tend to crack and skid. Lack of resiliency is attributed to branched polymer chains (caused by high temperature), while natural rubber consists of spring-like, coiled chains (formed naturally at "tree temperature").

Chemically, the new catalyst is α,α-dimethylbenzyl hydroperoxide. It is claimed to be less expensive and safer to handle than most peroxides, and superior to potassium persulfate, the conventional polymerization initiator, for other vinyl-type monomers such as styrene, methyl methacrylate, butadiene, butadiene-acrylonitrile and vinyl chloride.

Large scale production is expected early next year.

POLYETHER LUBES

A series of synthetic lubricants developed by Carbide moves into new fields, competes with a number of established chemicals.

THIS month another milestone was passed in the eventful history of Ucon lubricants when U. S. patent 2,425,755 was granted to their manufacturer, Carbide and Carbon Chemicals Corp. Skeptics and enthusiasts alike studied the patent with interest, gleaned from it some additional indication of the composition of these novel chemicals. And the development focussed new attention of the commercial progress of synthetic lubricants.

When Carbide introduced its Ucon materials a few years ago they were regarded as unique compositions. But how about their properties? Did they stand a chance of succeeding in the rough and tumble competition of the oil industry? Many thought not.

A Neat Niche

But it was evident by this month that the Ucon lubricants had carved a neat niche for themselves. Extensive marketing tests conducted by Carbide, and fleet truck trials carried through by independent operators, have yielded a mass of impressive data. Furthermore, these polyalkylene glycol derivatives are entering new fields, have corralled a sizable share of the nitrocellulose plasticizer business, are being used in drawing compounds, brake fluids, and cosmetics.

Productive capacity is still running far behind demand. Not until 1949, when raw material supplies are slated to ease, will Ucon output be sufficient to accommodate calls from consumers. It is now abundantly clear that Ucon synthetics must be regarded as potential competitors of a number of old-line materials—e. g. castor oil, glycerine, several phosphate esters, and special petroleum lubricants.

Discovery and Patents

The original Ucon work was carried out in the early 'thirties at the Mellon Institute of Industrial Research under a Carbide-sponsored fellowship. Since then research projects have been pushed at Mellon, Carbide's South Charleston laboratories, and at the research division of Linde Air Products Co., Tonawanda, N. Y.

Carbide has always been chary of discussing the precise chemical nature of these products, has confied its comments to the fact that it has 15 types available and two series—one water-soluble, the other water-insoluble. But two recent patents are significant. A short time ago the British patent office released an application made by Carbide. This document (25,614/45) describes reaction products of monohydroxy alcohols and 1,2-polyoxypropylene. And U. S. patent 2,425,755 covers the manufacture of similar compounds by reaction of mixed ethylene oxide and propylene oxide condensation products with monohydric alcohols to yield polyether alcohols. Molecular weights: at least 500.

Unique Properties

An outstanding feature of the Ucon materials is the fact that they can be tailor-made to perform specific functions. To yield a satisfactory synthetic lubricant it is not necessary to blend high and lower viscosity fluids, as is the general practice in preparing SAE grades from petroleum neutral and bright stocks. Principal characteristics: inherently high viscosity indices, low pour points, oxidation products of low molecular weight and high volatility.

The last mentioned feature is particularly important. Ordinarily, when mineral oils are oxidized in an internal combustion engine they yield oil-insoluble sludges, gums and varnish. That means fouled spark plugs and valve trouble. The high volatility of the Ucon oxidation products avoids all this.

Noteworthy also is the range of viscosities which can be obtained, running all the way from 50 to 75,000 at 100° F. Greases have also been prepared. Some function well at -100° F., others, as high as 300° F.

Petroleum oils and synthetics can best

be evaluated, of course, by comparing performance rather than physical characteristics. Notable in this conection are the findings of the New York Light and Power Corp. which road-tested the synthetics in a fleet of trucks travelling a total of 600,000 miles. Among the observations: reduced carbon formation, easy starting in cold weather, longer periods between oil changes and comparable oil and gas economy. Overall maintenance costs are listed as being "at least comparable."

Potential Markets

The automotive and aircraft fields naturally constitute the largest single market for lubricants, but, as yet, Carbide has not made strenuous efforts to cultivate the service station trade. Marketings of Prestone Motor Oil (75¢ a quart) have been confined to two small regions in the East, although distribution may be extended within the next year.

But there are economics to be considered. It is improbable that Ucon lubricants can ever be produced at a cost comparable to petroleum products, so the odds are that they will never take over a major proportion of ordinary lubricant sales. That they will put in a bid for a share of truck, bus and heavy engine business, however, there is no doubt.

Field of Promise

More promising by far are their possibilities in special markets; for there are some things the synthetics can do that no other compounds can do as well. In brake fluids, for instance, they eliminate gumming, and recently drafted SAE standards are all in their favor. Significantly, several of the top-volume car makers are already specifying Ucon fluids.

Too, the synthetics have demonstrated their worth as lubricants for tire bag molds. Heretofore, glycerine has been the old reliable, but the glycerine shortage favored Ucon trials. As a result the two commodities are now active competitors for this business. In the field of nitrocellulose plasticizers the Ucon materials are also finding a outlet. Just how firm a grip they hold on this business is, however, a question. The outcome will depend upon how sson more castor oil and derivatives are available, and at what price.

That Groomed Look—Cheaper

One of the more intriguing uses is in hair tonics. Here Ucon compounds replace castor oil in some formulations. What interests tonic makers is the possibility of using less alcohol—and more water.

Where fire is a hazard the synthetics are receiving a nod from hydraulic fluid compounders. In airplanes (water, Ucon, glycol, inhibitor) and in diecasting operations they are prime contenders. Here they run head on into petroleum-based pressure-transmitting fluids and some of the phosphates.

Likewise, and among the more significant advances, are inroads the Ucon materials are making in wire drawing, and, as a matter of fact, in general metal drawing. Conventionally, petroleum or animal fat derivatives have been used to lubricate dies, but when the wire is subsequently annealed these fats often leave a carbonaceous deposit on the metal, The synthetics volatilize, leave a bright, clean finish. Moreover, where degreasing tanks are usually employed to remove drawing oils from drawn metal parts—such as automobile fenders—a processing step is saved. The water-soluble type of Ucon can be flushed off and the metal is ready to be painted.

Ucon materials were designed as lubricants, and as such they are doing fine. But even if a drop of them never touched a bearing, they would still pull their weight as industrial chemicals. When they are more freely available, their protean character will be even more evident.

RESIN COUTURIER

Pittsburgh Plate Glass Co. introduces a whole series of new resins "individually designed to the customer's needs."

A FEW WEEKS ago Pittsburgh Plate Glass Co. turned part of its military-inspired research into commercial channels with the announcement of its Selectron series of resins. These resins are for the most part composed of styrene-modified unsaturated polyesters; in some instances, however, other unsaturated compounds are used in place of styrene for special applications.

The versatility of the new resins—by virtue of sundry variations in compounding—enables Pittsburgh Plate to appropriate an idea from the couturiers; custom-designing to please the trade. "Within limits," says Howard L. Gerhart, director of plastic research, "we are making the resins available in specifications individually designed to the customer's needs."

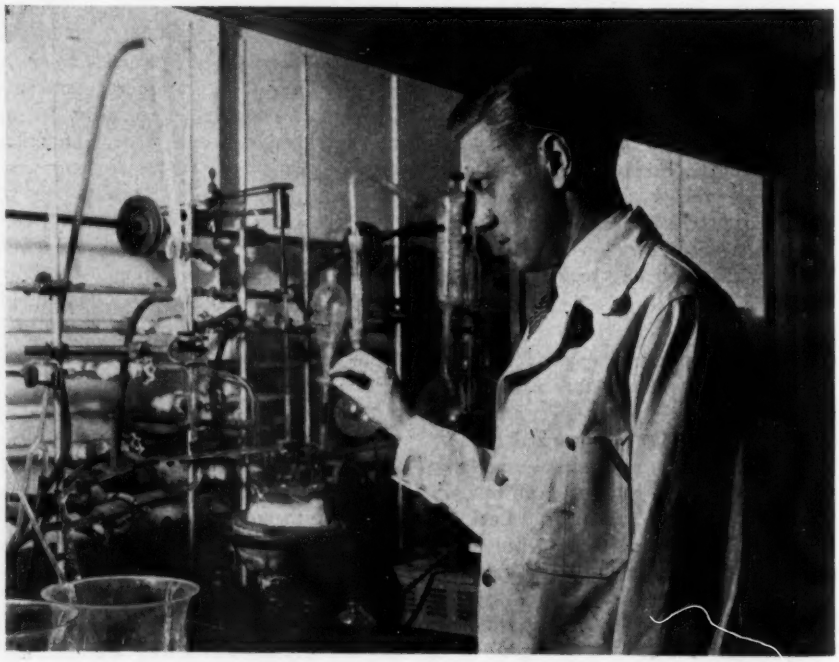
A Family of Five

All of the Selectron materials fall naturally into five groups: Group I, including the largest number and most generally useful members, are rigid resins having liquid monomers; they are designed for casting and laminating. Group II consists of flexible resins for lamination and impregnation, and they can also be used as permanent plasticizers for Group I resins. Rigid resins having solid or paste-type monomers, designed for special types of lamination, comprise Group III. Group IV codes have been reserved for a broad range of color concentrates—both soluble colors and pigment pastes—for incorporation into the other groups of resins. Those of Group V are designed for adhesives and for special surface coatings and impregnations.

All resins require peroxide catalysts, but they naturally cure at different rates and at different temperatures.

"Presales" Service

The angle that appears to be most significant is that much of the "technical service" or "customer service" was worked out before the resins were introduced; formulas have already been standardized to meet practically all conceivable re-



HOWARD L. GERHART: He cuts the cloth to fit.

quirements. But Dr. Gerhart says, "In working on special applications, it will occasionally be necessary to modify existing resins or to prepare entirely new compositions."

In spite of the fact that conceivable needs have been anticipated, inconceivable needs will undoubtedly crop up. And when the ready-made stock is inadequate, the tailor will step in.

OSMIC ENTERPRISE

Starting with little more than an idea, two men have built a robust business out of air odor control.

IF IMITATION is the sincerest form of flattery, few manufacturers have had to endure quite as many compliments in the past year as Airkem, Inc., the company which manufactures Air-wick and several other odor neutralizers and air fresheners. For the success of Air-wick promptly lured a flock of other concerns into the field, at least 70 different brands of wick-type household deodorants have been put on the market.

Little known, however, is the fact that Air-wick is merely one of Airkem's chlorophyll air fresheners. Much less renowned is its commercial and industrial counterpart, Airkem, sold in bulk to theatres, transportation companies, public buildings and factories. Currently, although Air-wick is hardly being neglected, Airkem is being accorded the benefit of a particularly aggressive promotional campaign. The themes: Airkem service means protection for your business . . . ends risk of offending your customers . . . helps keep workers happy on their jobs.

This idea, which Airkem has implanted in the minds of a fair number of industrial concerns in the past few years, has already paid off. Ever since 1943 sales have been pushing upward at an 80 degree angle (in 1942 and 1943 raw material and container shortages meant a "real struggle"). Nevertheless, the company feels that the total market has been barely scratched, is zealously streamlining its distribution set-up preparatory to scratching a little deeper.

As is the case with many concerns, Airkem is essentially the lengthened shadow of its founders. One, G. S. Paschal, a lawyer who became intrigued by odor problems, originated the formula; the other, W. H. Wheeler, a mechanical engineer who had specialized in air conditioning, sparked the enterprise's growth.

Perplexed Bankers

It all began in the late '30's when Mr. Wheeler was faced with a difficult job of air-conditioning design. A New York bank had called him in to install a unit to air-condition its executive offices—mainly those offices occupied by its directors. The only way that "outside air" could be brought in was by tapping an 18-story shaft in the center of the building. The set-up was completed, and shortly thereafter Wheeler returned to try to sell the bankers on the idea of air-conditioning the entire office building. The refusal was pointed. The temperature and humidity of the conditioned air met specifications, but it was stale and depressing. The directors dozed every afternoon. And, as bank officials put it, "Kill off our directors if you wish, but we need our workers." So, no more air conditioning.

A few days later Paschal wandered into Mr. Wheeler's office. He had a compound, called Ductone, which he claimed would freshen stale air, give it that country quality. Was Wheeler interested? He was. Shortly thereafter Wheeler resigned his post to turn full attention to air deodorization and freshening.

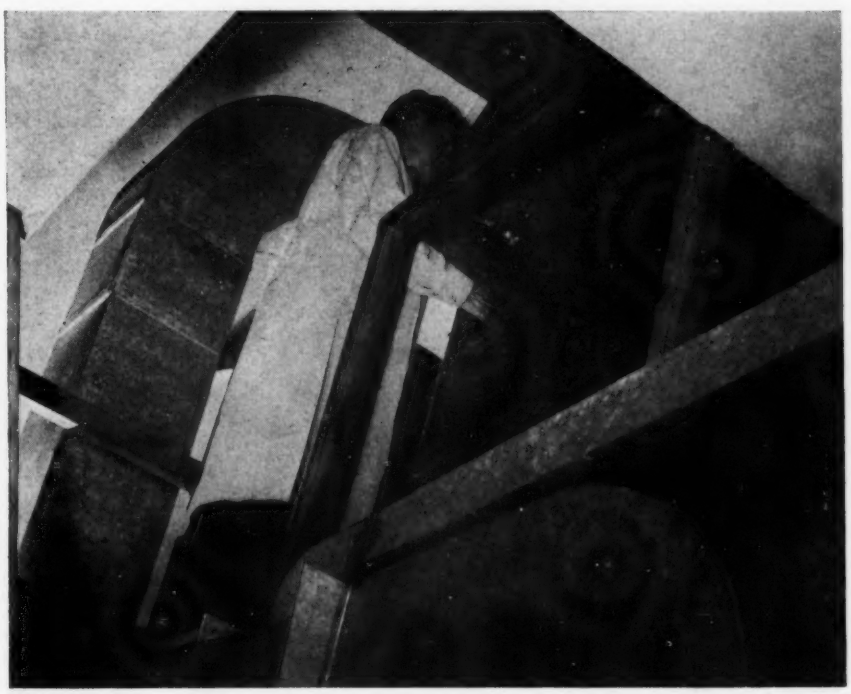
W. H. WHEELER: Dozing directors and a casual visitor.

As a first step, Airkem, Inc., was established to manufacture the chlorophyll-containing deodorant. It supplied one pint and 5½ oz. bottles to Seeman Bros., wholesale grocery concern (which at that time was desperately short of items to distribute). Seeman, granted rights for retail sales, sold the product under the tradename of Air-wick. W. H. Wheeler, Inc., had the industrial field as its domain, marketed its deodorant (identical in composition) as Airkem. Early this year the latter company merged with Airkem, Inc.

Criticism Leveled

There is no gainsaying that both the novelty and worth of Airkem have been roundly discounted. Some critics maintain that formaldehyde is the key, and that shrewd merchandising constitutes the only difference between Airkem and many other deodorants of the past and present. This Wheeler and his associates stoutly deny. They contend that their product never depended on the usual action of formaldehyde, point out that although the patent mentions formaldehyde, the use of the small amount involved (less than 1 per cent) has to do with "activation" of commercial chlorophyll. Some formulations now contain no formaldehyde whatsoever.

Most of the imitative products, they assert (the word imitative, rather than competitive, reflects their thinking), do rely on formaldehyde to deaden the sense of smell. Airkem, on the other hand, is claimed to counteract odors and *freshen* the air. Such freshening is the important key, and the "green grass" note of chlorophyll is tagged as basic.



AIR INTAKE DUCT: Dilution is not the answer.

That there is pine oil in the formulation they also concede, plus a number of other essential oils, natural and synthetic aromatics. (Seeman advertises that there are 125 ingredients in Air-wick, but the categorization is loose: Any single essential oil contains a myriad of substances, so a blend can contain 125, or 500, depending on how fine a classification is made.)

Dearth of Data

One thing that the entire Airkem staff of 40 researchers deplores is the lack of scientific data available on the subject of odors. To their minds the study of odors, or osmic research, has been neglected. There are admittedly two theories as to how odors are transmitted. One school supports the wave theory; another, the vapor, or particle dispersion. Neither is wholly satisfactory, however, and arguments can be summoned to dispute both. As it is, Airkem chemists have compiled a bibliography of 4,000 references to odor work and assembled a file of 6,000 distinct odors. Now they are pursuing basic research, hope to propound a new theory of osmology.

One fact they have already established: People can be trained to identify chemicals by "odor radicals." That is, the methyl radical has a characteristic note. So has the acetate radical. Thus a few sniffs could identify a compound as methyl acetate, methyl salicylate, etc.

An Important Stewardship

Currently the company is directing its major efforts to boosting industry's acceptance of Airkem. Theaters, night clubs, and public buildings offer attractive possibilities, and 18 distributors have been appointed in recent months to push sales to such organizations. However, Wheeler, Airkem president, is a zealot, feels that they enjoy the stewardship of a development which can benefit thousands of people who are forced to work in factories and offices and are deprived thereby of the benefits of fresh, invigorating air. They would much prefer to "air freshen" one factory than several night clubs.

Now in the testing stage are units installed on trains and busses; airlines are pretty well sold. The prospects in the transportation field are especially enticing.

Odors, Not Stenches

Air freshening does not necessarily compete with air conditioning. A large air-conditioning unit can bring in enough outside air to dilute any internally generated odors, but such odor dilution, Wheeler contends, is inordinately costly and seldom practiced. Much easier and less expensive is the job of deodorizing air and imparting to it an undertone of "freshness." Thus Airkem works fairly closely with air conditioners, markets its fluid to be fed into intake ducts.

Activated carbon systems are, competitive naturally, in one sense: They can actually remove odors. This, Airkem is not designed to do. It can be used to treat fairly odoriferous air, but not outright stenches.

At the moment, Wheeler and his associates are busy developing special formulations to do special jobs. Apart from the standard "green label" Airkem they are now producing two others—one for animal odors, the other for washrooms. These are standard items already, and others are in the works. In addition to carrying out compounding research, they are making new equipment vaporizers of various sizes designed to disseminate the liquid in buildings which are not air-conditioned.

The U. S. market will be cultivated first, but also on the docket are plans to broaden overseas distribution. And, if Airkem has its way, few indeed will be the people who do not breathe air freshened with that characteristic "green grass" note.

WAX TO WEAR

After two years of careful test marketing, a wax emulsion textile rinse takes a major step forward.

IT ISN'T often that a specialty is placed on the market to which no generic name can be assigned, for, ordinarily, most products fall into such simple categories as cleaner, or polish, or insecticide. But this month S. C. Johnson & Sons, Inc. is beginning the retail promotion of a new item blessed only with the tradename Drax. In its advertising the company calls Drax a dirt-resistant liquid, and adds that it is "not a starch . . . not a soap . . . it's Drax . . . the miracle rinse that restores your washables' fresh, new look."

Miracle Rinse

Actually the new addition to the Johnson line (which includes Johnson's Wax, Glocoat, and Carnu) is a wax emulsion which the company has been selling for the past few years to commercial laundries and dry cleaners. Those were bulk sales, however, and now Johnson is out to cultivate the household trade. Its ambition: to convince housewives that rinsing with Drax makes garments "stay clean longer . . . wash easier . . . iron more speedily."

Commercial Premiere

When the idea of a wax emulsion treatment for textiles was conceived in the Johnson laboratories the war was threatening. Soon the armed forces issued a call for a material with which to treat service clothes so that they would be more dirt resistant and water repellent. The research program, under the direction of Dr. J. Vernon Steinle, was pushed and Johnson began to supply large quantities of Drax to the military. Too, during the same period, enough Drax was sold to commercial laundries and dry cleaning establishments to sound out market possibilities.

It was not until 1945, however, that company officials began to explore consumer possibilities by means of test marketings carried through in Clinton, Iowa, Galesburg, Ill. and Hartford, Conn. These regional campaigns yielded enough data to warrant more extensive promotion and now Johnson is letting loose with an

"MIRACLE-RINSED" FABRICS: Part of a four-pronged drive.

J. VERNON STEINLE: A new idea, a new item, but no generic name.

all-out, year-long merchandising effort which will cover three west coast states.

New Price, New Consistency

In the original tests Drax was sold at a neat 79c. Since then both the size of the jar and the consistency of the emulsion have been changed. The new 10½ ounce jar is priced at the popular 39c level, is designed to yield 10 quarts of rinse, or roughly enough for four average household washdays.

Particularly noteworthy is the four-pronged effort that Johnson is directing, calculated to move Drax into the volume sales bracket. Apart from the advertising barrage it is laying down to sell Drax to housewives, the company is also pushing bulk sales to laundries and dry cleaners. The main objective in this case is to get laundry customers to specify Drax-ing. Cleaners are far from adverse to this idea, cooperate eagerly, for a simple rinse yields them a fat premium. Concurrently, department stores are being impressed with the advantages they can gain by selling clothes made from Drax-ed fabrics. Thus, sales to textile mills can be boosted.

Consumer Courting

At the moment Johnson is making no plans for additional regional campaigns or for national distribution. Not until it sees how the miracle rinse fares in the full-scale west coast test will any decisions be made.

However, if all goes well, the nation's number one wax polish maker will be courting many more housewives with the message that fabrics rinsed in Drax "wash easier because dirt rinses gently away . . . stay clean longer because dirt and soil are not readily absorbed . . . iron speedily because the iron fairly glides over them."

FLEXIBLE PHENOLICS

Blends of phenolic resins and synthetic rubbers may provide novel, and useful, coating materials.

PHENOLIC resins have long been classified as the "work horses" of the plastic family. They are tough, strong, serve a multitude of uses. Nevertheless, their field of application has been limited by their inherent lack of flexibility.

There have been a good many efforts made, naturally, to modify phenolics, to overcome these shortcomings. But most attempts have met with failure because the resins are either incompatible with general plasticizers or their inherent, valuable properties are destroyed.

A Novel Suggestion

Recently, however, chemists of the Standard Oil Development Co. and its affiliate, the Enjay Co., made a novel suggestion. Their contention: phenolics and the synthetic rubber Perbunan NS can be blended, yield thereby compositions of interesting color, flexibility, and improved impact resistance. In addition, they claim, phenolics and S-polymer (hydrocarbon resins) blends have properties superior to those of the phenolics alone. In particular, processability and tear strength are better.

Tough "Leathers"

They stress that the work conducted to date is merely preliminary, that many more possibilities have yet to be evaluated. Nevertheless, they feel that such compositions may mean long-wearing, strong, flexible artificial leathers and a myriad of kindred products.

At least a new chapter has been opened in the life of the sturdy phenolics, and quite possibly, one of rather portentous character.

FISH OIL FADEOUT

Synthesis of vitamin A, now in the pilot plant, may eventually oust fish liver oils as a source.

BACK IN 1915 two scientists discovered that rats grew better on a synthetic diet plus egg yolk than on the same diet plus lard. The elusive factor in the eggs was finally tracked down, labeled A.

Later the chemical constitution of the vitamin was worked out, and at the same time nutritionists learned about its occurrence in nature and its role in human metabolism.

From time to time, since 1937, reports of its synthesis have been published, but the low biological potency of synthesized materials has always cast a doubt on the validity of these claims.

Last month, at the American Chemical Society meeting in New York, six chemists of Distillation Products, Inc., presented data to prove that they had succeeded in synthesizing vitamin A by a new method. Their product, moreover, is identical in every respect—even to the 3,300,000 U. S. P. units per gram—with the natural crystalline vitamin, first prepared about seven years ago in the same laboratory.

How the material is synthesized was not divulged; it is understood that patent coverage on the process has not yet been obtained. But it was asserted that the process is different from those previously described for the preparation of compounds having vitamin A activity.

By Analogy, a New Industry

The synthetic vitamin is a light yellow, viscous oil, totally free of the fishy odor

JAMES G. BAXTER: With five others, pitted against the cod.

that makes some natural vitamin A concentrates objectionable in food and drug products. For this reason—other things being equal—the synthetic should outdistance the natural in popular acceptance.

Whether other things are equal is a question that was left unanswered; no indications were given of raw materials yield, cost of processing, and other factors which will make or break it from the standpoint of economics.

But production is now under way in a pilot plant, and Research Director K. C. D. Hickman says that "there seems little doubt that the synthetic vitamin A is here at last to augment the world's . . . supplies of the natural vitamin."

Also, in spite of the natural occurrence of vitamins, almost 3,000,000 lbs. of synthetic vitamins B, C, D, E and K were made in 1945.

It is reasonable to assume that synthesis of vitamin A may also become an industry. Distillation Products seems to think so.

SYNTHETIC SPRUCE

Spruce lignin has been synthesized from vanillin. Now that lignin structure has been elucidated, real progress may be made.

EVEN the most enthusiastic chemurgist will admit, if pressed, that 38,000,000 tons of lignin, dumped into his lap each year as a by-product of cellulose extraction, is pretty much a white elephant. To be sure, some of it is used for making vanillin, reinforcing plastics, and treating road surfaces, but it is in the main an unprofitable disposal problem.

For 70 years chemists have tried to fathom its structure, realizing that if its chemical constitution were known, something might be done with it. The knot has now been unraveled, by Alfred Russell of the Northern Regional Research Laboratory, and it turns out that the structure is much simpler than chemists thought.

He Took Vanilla

Taking his cue from the fact that decomposed lignin is rich in vanillin—some of which is made that way, incidentally, for vanilla flavoring—Dr. Russell reconstructed lignin from vanillin. He made vanillin acetate and treated it with aluminum chloride; the starting material rearranged, lost water and cyclized all in one step to give poly-8-methoxydihydrobenzopyrone, which turned out to be identical with spruce lignin. (This kind is found in all trees having naked seeds, another kind in trees having enclosed seeds.)

It is not quite correct to say "identical", for the synthetic product is somewhat darker, contains fewer methoxyl groups. This is undoubtedly due to the fact that aluminum chloride is a severe catalyst, known to knock off methyl groups readily. In all other properties—solubility, appearance, chemical behavior—the natural and synthetic are identical.

ALFRED RUSSELL: He took vanilla and worked backwards.

It is fairly obvious that a chemist can do better with a known than with an unknown material. Now that lignin is understood, its chemical values may be turned to profit. Exploitation of lignin as a raw material could not only conserve other, scarcer natural resources, but also lower the cost of lumber, paper, rayon and other wood products.

BUBBLE BOOM

A lucky accident has already put a novel formulation of Vinylite into the hands of 43,000,000 bubble-blowers.

THE STORY of the Three Princes of Serendip has been told too often for another repetition. Suffice it to say that they were favorded, in the course of their lives, by a happy combination of chance and sagacity—so favored, in fact, that this combination has come to be called "serendipity."

It was a clear case of serendipity that Dr. Ferdinand Ringer, Austrian-born chemist now in New York, should by chance blow a Vinylite bubble, and that certain of his friends should immediately see the profitable possibilities.

Clever Like a Fox

That's how Bub-O-Loon, Inc., was born. Matthew Fox, vice-president of Universal Pictures, put up $174,000. He got Bud Mesburg, an eager toy salesman, to come in as sales manager. In six short months they have sold over 43,000,000 tubes of the Vinylite-acetone mix to bubbling youngsters and oldsters on three continents, who put a "glob" of the plastic on a blowing tube, blow cellophane-like, semi-permanent bubble balloons of various shapes and sizes.

Sales have now reached a weekly rate of over 2,000,000 tubes, of which about a third are sold in Puerto Rico, South Africa, the Phillippines and Canada. Mesburg expects the present level of sales to hold through Christmas.

Bakelite Corp. ships 25 tons of Vinylite a day to Bub-O-Loon's nine factories. There the mix is prepared and shipped to contractors for filling into 1- and 2-oz. tubes. Retail price: 29c and 49c.

Colored bubbles are the latest wrinkle. So far Bub-O-Loon is available in red and blue (non-toxic dyes), and other colors are on the way.

Aces Up the Sleeve

The idea is so amazingly simple that Bub-O-Loon's backers haven't tried to patent it; as a result there is naturally a scramble for the lucrative market. Bub-O-Loon, relying on its head start, is managing to hold on to 90 per cent of the business.

BUD MESBURG: Bubbling youngsters blow a bonanza.

How long the business will last is a matter of hot debate. Pessimists think it's a passing fad; Mesburg agrees that the volume will slide down after the holidays, but thinks there will be a large steady demand — maybe $15,000,000-a-year's worth.

In any event, the company won't be caught napping. A variation on the theme, still under wraps, is already in the works.

Then there's a more serious item on the agenda: a 50-strike match. Ringer invented the multi-strike match while in Europe, sold it to Ivar Kreuger's notorious cartel, whence it never emerged to see the light of day. Now Kreuger is gone, and Ringer is perfecting the details of the match.

Thus, although Bub-O-Loon is at the moment "seeking the bubble reputation," weightier things are on the way.

FLUORINE FILTER

In view of the fact that as little as five parts per million of fluorine or hydrogen fluoride in the air can destroy vegetation, and considering the probability that large tonnages of these materials will soon be used by the chemical industry, disposal problems are now attracting more than casual attention.

This month, a new technique, simple, cheap, and capable of handling more than 500 pounds of fluorine per hour, was described by the Scientific Design Co., New York. The key: before waste gases containing fluorine or hydrogen fluoride are released into the atmosphere they are bubbled through an absorbing solution of caustic soda. The soda solution can be continuously revitalized by means of lime.

Main advantages: caustic soda has high absorptive powers; lime is cheap, precipitates out the absorbed fluorine.

LIQUID STARCH

Capitalizing on a high convenience index, ready-to-use starch compounds put in a strong bid for the household market.

ANY NEW specialty which *simplifies* the performance of a household chore is sure to gain ready consumer acceptance; any new product which *eliminates* a bothersome household task soon becomes a volume item. If a specialty both simplifies one task and eliminates another, it is a "natural" and its future is assured. And that is what a good many companies feel they have found in liquid starches—starch solutions containing bluing which require only dilution before being used.

Stiff Curtains, Limp Collars

The advantages that such starch compounds hold over ordinary dry starches are tangible. Home preparation of a "starching solution" involves boiling to form a starch paste, entails difficulties in gauging the "starchiness" of solutions, often means that curtains emerge from the laundry as stiff as boards, shirt collars as limp as flannel. Liquid starches, purchased as solutions of standard concentration, are simply diluted with cold water before use. No boiling is necessary and they are easily and accurately measured. Guesswork is gone.

Another work-saving feature of the liquid products is provided by the incorporation of "bluing" in the formulation. Swishing clothes through the starching solution both starches and "whitens", saves a separate bluing rinse.

Exploitation of an Idea

The idea of marketing liquid starch is not in itself new, but is is only within the past year that much attention has been paid to its commercial exploitation. Actually, one of the first patents covering starch compositions of this nature was issued in 1941 (U. S. 2,228,734). Assigned to Simon Spilka, it describes a non-separating, non-sticking, fiber-penetrating liquid starch and the process for its preparation. When the idea caught hold dozens of starches appeared on the market. However, many were hastily and improperly formulated. Since then competition has eliminated most of the poorer quality products.

Costly Ignorance

Not fully realized by most of the early makers was the fact that the compounding of a really satisfactory starch specialty is not quite as simple as it would seem at first glance. The ideal liquid starch must possess a rather impressive list of properties.

Stability is one of the most important of these. A marketable starch must not separate over a long period of time, even when subjected to temperature extremes and exposures to sunlight. Likewise, it must not support mold growth. Moreover, the ideal liquid starch should have a light-fast bluing added which will impart a good blue to white clothes, yet not affect other colors. It should also be mildly perfumed, non-sticking, and penetrate the fiber readily.

From the manufacturer's standpoint the viscosity of the liquid composition should be such that maximum efficiency may be obtained from automatic filling machines during bottling. The finished product should flow readily from the bottle when

TUESDAY MORNING: Money to be made by getting rid of guesswork.

cool, yet be stiff enough so that it will impart a desirable finish to the fabric when diluted for use.

Formulation Findings

To obtain these features most manufacturers now follow a fairly standard practice. Usually from 8 to 10 per cent (on a dry basis) of solubilized starch is pre-dissolved in cold water. Boiling water is then added and the mixture is stirred and held at 100°C. for a few minutes. The starch is then cooled, while being stirred, and pine oil is added with a subsequent blending in of a small quantity of bluing. The pine oil, incidentally, serves several purposes; it acts as a perfume, penetrant, dispersing agent and mildew-preventive.

While liquid starches have many attributes as far as the homemaker is concerned, they do suffer from some shortcomings from the manufacturer's viewpoint. In particular, the transportation of heavy bottles containing 90 per cent water is expensive. It is for this reason that liquid starch producers are located near the market they expect to supply.

Unique Opportunity

This, of course, puts the smaller operator in a favorable position and permits him to compete rather readily with larger national concerns. In many respects the liquid starch business is similar to the pattern which has been developed in the household bleach industry. Hundreds of small companies compound bleaches and sell them within a limited radius of their factories. No single company has a lion's share of the sales volume.

In the trade, liquid starches are regarded as having a high "convenience index." It is on this basis that they are sold. Already they have won the acceptance of consumers in the higher income brackets. Nevertheless, starch itself is cheap, and a real decrease in the price of the liquid products appears to be necessary to push the liquid starches into the large volume bracket. Just how much prices can be lowered is a moot question.

The Outlook

Nevertheless, the outlook for liquid starches, on the whole, is promising. Many companies are already in the field; many more will be placing such products on the market within the next few months. There is only one feature which is causing a little concern, and that is the keener competition in the offing.

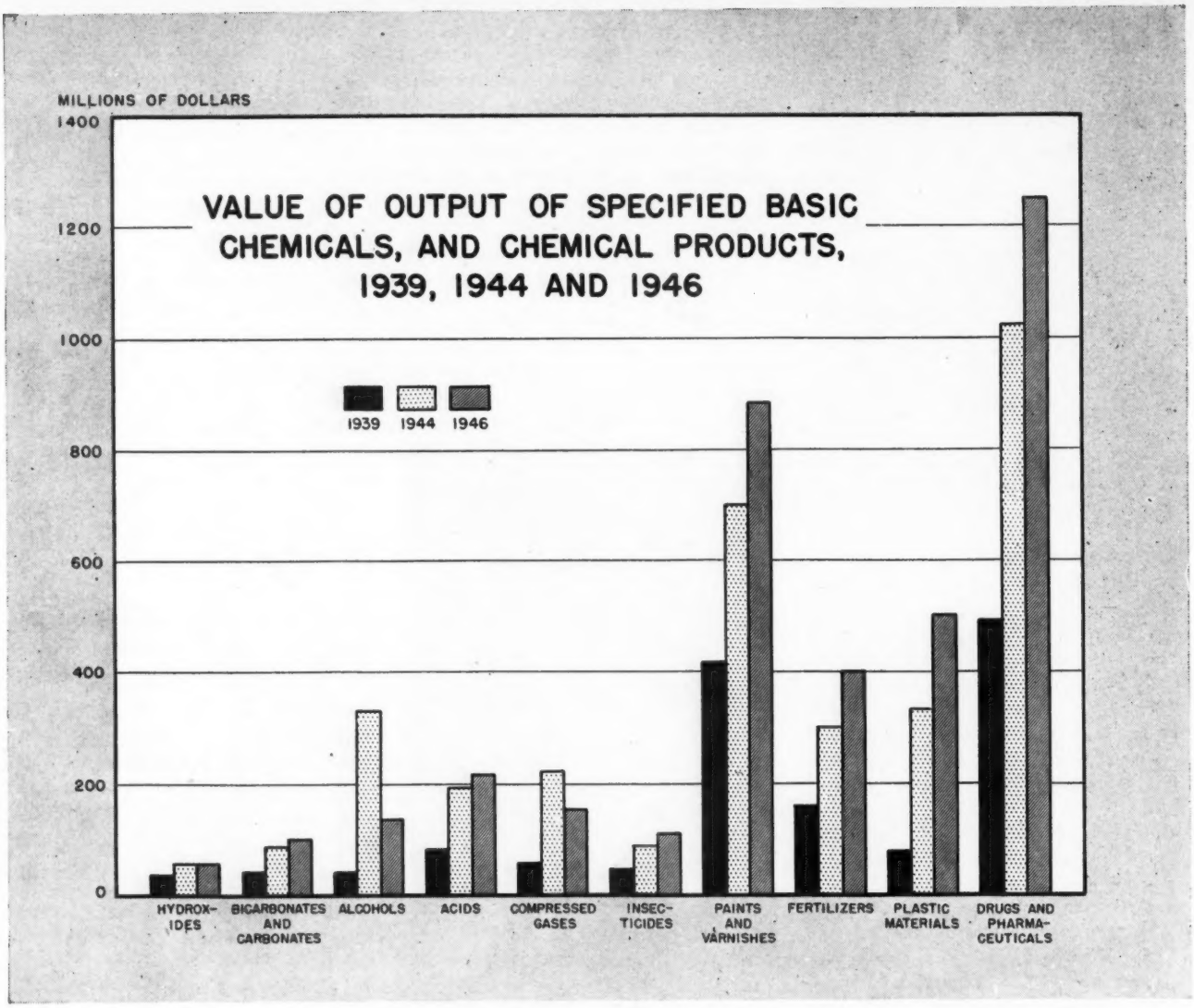
At the moment one progressive starch manufacturer is test-marketing a dry starch which is readily soluble in cold water and which gives textiles the same "hand" as a cooked starch. It is on this development that liquid starch makers are keeping a sharp eye.

SUPERPHOSPHATE SPEED-UP

A process for making concentrated or "triple" superphosphate by continuously mixing phosphate rock and phosphoric acid in a new type of mixer has been developed, and put into practice, by the TVA.

In the process, strong phosphoric acid and finely pulverized phosphate rock are fed at automatically controlled rates into a funnel-shaped mixing bowl in such a way as to produce a whirlpool effect. The mixture is discharged from the bowl while still liquid onto a moving conveyor belt. After a few seconds it solidifies and is transferred to storage.

Key to the process is the fact that when the acid and rock are mixed a fluid slurry results. Within a matter of seconds, however, the slurry becomes plastic and finally solid. In batch-mixing it is not possible to obtain thorough mixing and discharge the mixers while the mixture is still fluid. Consequently, the mixing operation is slower, requires more equipment, power, and operators.



1946 CHEMICAL OUTPUT Hits All-Time HIGH

by C. C. CONCANNON, Chief, and F. M. HOFFHEINS
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THE VALUE OF BASIC CHEMICALS AND CHEMICAL PRODUCTS produced last year amounted to a whopping $8,700,000,000, a record output for the American chemical industry. Although basic chemicals declined from their wartime peak, other products more than made up for them.

DURING 1946, the first full postwar year, value of basic chemicals and chemical products amounted to nearly $8.7 billion. This was 160 per cent over the $3.3 billion output in 1939 and represents an all-time high for the chemical industry.

Production of basic chemicals tapered off to $2.4 billion in 1946 from a peak of $2.7 billion in 1944, but was still 200 per cent above the peacetime year of 1939 when output was well under a billion dollars. Value of chemical products continued on the rise, reaching in 1946 a total of $6.3 billion, 2½ times the $2.5 billion output in 1939.

This is the fourth of a series of similar studies designed to bridge partially the gaps left by absence of a Census of Manufactures since 1939. Present plans call for a Census of Manufactures covering 1947, with results to be available in late 1948. Two studies were prepared in the Chemicals Bureau, WPB, covering wartime output of 1943 (CHEMICAL INDUSTRIES, November 1943) and 1944 (*Chemical and Engineering News*, January 25, 1945), and a third was prepared in the Department of Commerce with the cooperation of the Chemical Division, CPA. (*Domestic Commerce*, August, October, and November 1946).

Previous articles included as part of the industry's output such raw materials as phosphate rock, potash, and crude sulfur, and such products of chemical processing industries as glass, matches, and coated fabrics, because these products were under control of the Chemicals Bureau, WPB. These commodities are omitted from the present study. Their value in 1939 was

$411 million, rising to $667 million in 1943 and 1944, and dropping to $625 million in 1945. Fats and oils were not included in any of these studies.

PEACE NEEDS HIGH

The chemical industry in the past 7 years has grown to over twice its prewar size (see Table 1). Wartime requirements were a major factor in this accelerated advance, but peacetime requests have been of such magnitude as to absorb most of the potential output of expanded facilities. In some instances, as in alkalies, even production at peak war levels has been unable to satisfy postwar clamor here and abroad, and new facilities are necessary. Wartime developments, sometimes modified for civilian needs, brought forth many new uses for chemicals. Unsatisfied requirements for products unavailable before the latter part of 1945 or early 1946 made it possible for manufacturers to continue expansion.

Peacetime demands for basic chemicals, the building blocks for chemical products, have been only slightly less than requirements for global war. Present needs have greatly increased over prewar consumption because of pent-up demands, introduction of new products, and increased consumer income. Since a large part of wartime requirements for basic chemicals stemmed directly or indirectly from munitions and other war supplies, it is not surprising that production of some materials formerly utilized in manufacture of explosives and synthetic rubber decreased (Table 2). However, output of other basic chemicals such as alkalies remained at, or even exceeded, wartime levels. Chemical products, generally, showed increases since 1944 (Table 3). This was especially true of such consumer goods as cosmetics, cleansers, and polishes, output of which had been restricted during the war.

ORGANICS GREW FASTEST

Output of organic chemicals quadrupled during the war period while inorganic chemicals showed more modest increases (see Table 4). In 1939, inorganic chemicals comprised over 50 per cent of the value of basic chemicals, but in recent years they have been about 40 per cent.

Changes in value of output in 1946 from 1945 indicate fairly accurately differences in the volume of production, as price levels on basic chemicals and chemical products varied little until removal of price controls in November 1946. Volume of production of basic chemicals and chemical products in 1946 was more than double that in 1939 after due allowance is made for an estimated 23 per cent increase in prices (see Table 5). Estimated percentage increase in the volume of production above 1939 was approximately 93 for 1943; 116 for 1944; 122 for 1945; and 130 for 1946.

Undoubtedly, output of chemicals would have been larger in 1946 had it not been for hindrances caused by labor-management disputes, both in the chemical industry and in coal mining, a major supplying industry. Production was also handicapped by shortages of steel drums, paper bags, and freight cars.

A $2.4 billion expansion[1] of facilities

[1] Chemical Plant Expansion, D. P. Morgan, *Chemical and Engineering News*, Vol. 25, No. 2, January 13, 1947, p. 78.

TABLE 1.—VALUE OF OUTPUT[1] OF THE CHEMICAL INDUSTRY, 1939, 1943-46.

(*Millions of dollars*)

	1939	1943	1944	1945	1946
Basic chemicals	790.4	2,235.7	2,710.1	2,507.1	2,378.5
Chemical products	2,507.4	4,662.9	5,074.9	5,561.3	6,311.1
Total	3,297.8	6,898.6	7,785.0	8,068.4	8,689.6

[1] Value of products produced for sale or transfer from producing plant. No value is assigned to chemicals consumed where made. Census of Manufactures data used for 1939, 1943-1946 figures are estimates.

TABLE 2.—VALUE OF OUTPUT OF BASIC CHEMICALS[1], 1939, 1943-46.

(*Millions of dollars*)

Chemicals	1939	1943	1944	1945	1946	*Items Included*
Acetates	22.9	55.0	56.1	66.5	60.0	Butyl, ethyl, lead, sodium, etc.
Acetone	2.9	15.7	18.6	14.1	14.0	
Acids	82.3	187.0	194.3	221.9	217.0	Acetic acid and anhydride, boric, hydrochloric, nitric, phosphoric, sulfuric, tartaric, etc.
Alcohols	40.6	246.0	332.4	242.6	136.0	Ethyl, butyl, methyl, etc.
Ammonia	9.9	[2]	[2]	[2]	31.7	
Bicarbonates and carbonates	42.3	83.9	86.2	91.7	100.0	Sodium, calcium, magnesium, etc.
Bromides	9.5	[2]	[2]	[2]	[2]	
Bromine	0.5	[2]	[2]	[2]	[2]	
Calcium carbide	8.5	29.7	37.5	30.8	25.0	
Carbon, activated	1.9	3.5	3.6	4.2	4.6	
Carbon disulfide	5.2	9.5	10.1	11.9	10.8	
Carbon tetrachloride	3.3	7.2	8.3	7.5	7.1	
Chlorides, except sodium	18.8	43.6	59.0	63.2	62.5	Aluminum, ethyl, ammonium, sulfur, etc.
Chlorine	10.5	15.1	18.0	17.5	18.0	
Chlorine bleaching compounds	12.0	35.8	35.0	35.0	35.0	Calcium and sodium hypochlorite, bleaching powder
Chromates and bichromates	6.8	10.6	10.6	10.3	12.1	Sodium, potassium, ammonium, etc.
Citrates	0.9	[2]	[2]	[2]	[2]	
Cyanides	4.1	[2]	[2]	[2]	[2]	
Ester gum	1.8	3.6	5.6	5.7	5.9	
Ethyl ether	1.4	6.5	6.9	6.9	4.1	
Fluorides (except carbon)	1.8	[2]	[2]	[2]	[2]	
Hydroxides	37.6	55.4	59.0	57.0	59.0	Sodium, potassium, etc.
Iodides	1.2	[2]	[2]	[2]	[2]	
Iodine	0.5	[2]	[2]	[2]	[2]	
Modified sodas	1.3	[2]	[2]	[2]	[2]	
Nitrates, except sodium	8.9	[2]	[2]	[2]	44.6	Ammonia, etc.
Oxides	10.1	16.5	17.0	17.5	17.0	Antimony, magnesium, chromium, mercury, tin, etc.
Peroxides	4.4	4.9	6.3	6.9	7.0	Hydrogen, etc.
Phosphates	20.1	27.2	29.0	34.6	35.4	All sodium and calcium, others
Salicylates	0.6	1.4	1.8	1.8	1.8	Methyl, sodium
Sodium salts, not elsewhere classified	2.8	[2]	[2]	[2]	[2]	
Sodium silicates	0.2	14.0	19.2	18.4	18.4	Water glass, meta, ortho, sesqui
Stearates	1.4	3.0	3.5	[3]5.6	6.2	Aluminum, zinc
Sulfates	22.9	41.0	41.0	42.0	35.0	Aluminum, copper, magnesium, sodium, etc.
Sulfides	2.3	2.7	2.9	2.7	2.6	
Sulfites	5.2	13.0	16.8	15.0	15.0	
Sulfur dioxide	1.3	1.5	1.5	1.5	1.5	
Sulfur, refined	3.4	4.1	5.3	6.1	6.3	Ground, flowers, etc.
Tartrates	1.4	1.4	1.4	2.6	1.9	Potassium bitartrate, etc.
Miscellaneous small items	2.1	5.0	5.5	5.5	5.5	Bismuth compounds, lactates, aluminum hydrate, linoleates, ammoniated mercury, oxalates, etc.
Coal tar products, crudes and intermediates	73.4	290.0	370.0	320.0	350.0	
Coal tar products, finished	105.5	270.0	290.0	330.0	360.0	Dyes, flavorings, and perfume materials, rubber processing chemicals, etc.
Other inorganics	70.4	150.0	200.0	190.0	185.0	Calcined alumina, sodium nitrate, sodium borate, yellow phosphorus, sodium metal, calcium molydate, etc.
Other organic	116.5	460.0	625.0	500.0	450.0	Tetraethyl lead, tetrachlorethane, nitrocellulose (not plastic), ethylene glycol, formaldehyde, trichlorethylene and other synthetic organic compounds
Items not shown separately in 1943, 1944, 1945	[4]41.4	121.9	132.7	120.1		
Items not shown separately in 1946	[4]22.6				32.5	
Total, chemicals	790.4	2,235.7	2,710.1	2,507.1	2,378.5	

[1] Value of products produced for sale or transfer from producing plant.
[2] Value cannot be published without disclosure of confidential information.
[3] Revision.
[4] Magnesium metal included in 1939 but excluded from estimates in other years.
[5] Not included in total.

in the chemical industry during the war and postwar years over the 1939 value of $3 billion has been a major factor in the chemical industry's growth during the past 7 years. These expanded facilities required new chemical manufacturing equipment; $64 million worth of such equipment was shipped during 1944, according to the Bureau of the Census.

Available data indicate that shipments of such machinery reached a peak during the second quarter of 1944, with a gradual decrease during 1945 to a total of $42 million, and a drop to a still lower level during the first half of 1946. In 1939, basic chemicals plants spent $35 million on new equipment.

Shipments of plastics working machinery reached a wartime peak of $1.6 million during the fourth quarter of 1944, totaling $4.9 million for 1944, declining to $4.1 million in 1945. They rose during the first 6 months of 1946 to a total of $8.1 million, June 1946 shipments having the record value of $1,966,000. In 1939, plastics plants bought equipment valued at $6.2 million.

TABLE 3.—VALUE OF OUTPUT OF CHEMICAL PRODUCTS[1], 1939, 1943-46.

(*Millions of dollars*)

Chemical Product	*1939*	*1943*	*1944*	*1945*	*1946*	*Items Included*
Blacks (bone, carbonlamp)	14.9	25.0	32.0	52.0	72.0	Carbon (furnace and channel)
Bluing	1.1	1.6	1.6	1.6	1.6	Laundry blue
Cleaning and polishing preparations	89.5	98.0	98.0	100.0	125.0	Automobile polishes, leather dressings, cleaning preparations, escept soap
Compressed gases	58.4	175.0	222.0	181.0	154.0	Oxygen, acetylene, carbon dixodie, hydrogen
Cosmetics	[3]212.5	412.0	408.0	550.0	600.0	Perfumes, cosmetics, and toilet soap
Drugs, pharmaceuticals, and medicinals	[3]492.7	934.0	1,025.0	1,200.0	1,250.0	Alkaloids, biologicals
Explosives, industrial	63.7	150.0	150.0	150.0	110.0	Dynamite, nitroglycerin, blasting powder, gunpowder, etc.
Fertilizers	161.9	280.0	300.0	330.0	400.0	Mixed fertilizers, superphosphate
Glue and gelatin	34.4	50.0	83.0	75.0	100.0	Animal glue, gelatin
Gum naval stores	17.4	22.0	22.0	32.0	41.0	Rosin, turpentine
Wood naval stores	13.4	28.0	23.0	[3]34.0	43.5	Rosin, turpentine
Hardwood distillation and charcoal	7.0	8.4	8.5	6.7	5.8	Acetic acid, methyl alcohol, charcoal, and other wood chemical products
Insecticides	45.7	80.0	85.0	100.0	110.0	Arsenicals, rotenone, pyrethrum, DDT, fungicides, household disinfectants
Mucilage, paste and other adhesives	8.2	40.0	42.0	44.0	45.0	Mucilage, paste, mending cement, sealing wax and other adhesives, except glue and rubber cement
Paints, varnishes and lacquers	418.4	620.0	700.0	715.0	885.0	Paints, varnishes, lacquers, enamels, driers, fillers, putty
Pigments and colors	113.1	155.0	155.0	165.0	200.0	Lead, zinc and titanium pigments, dry colors, lakes and toners.
Plastic materials	78.0	300.0	332.0	360.0	500.0	Cellulose and other plastics, synthetic resins
Plastic products, fabricated	71.9	261.0	306.0	330.0	470.0	Laminated and molded products
Printing inks	44.3	50.0	50.0	50.0	65.0	Excludes writing inks
Rayon and other synthetic fibers	246.0	460.0	497.0	544.0	585.0	Nylon
Salt (evaporated and rock)	23.0	37.9	39.8	41.0	38.2	Excludes brine
Soap and glycerin	291.9	475.0	495.0	500.0	500.0	
Total, chemical products	2,507.4	4,662.9	5,074.9	[3]5,561.3	6,311.1	

[1] Value of products manufactured for sale or transfer from producing plant.
[2] Partially estimated by War Production Board.
[3] Revision.

TABLE 4.—VALUE OF OUTPUT[1] OF BASIC CHEMICALS BY GROUPS FOR 1939, 1943-46.

(*Millions of dollars*)

Group	*1939*	*1943*	*1944*	*1945*	*1946*
Organic chemicals, total	377	1,367	1,726	1,509	1,400
Cyclic (coal-tar) crudes and intermediates[2]	73	290	370	320	350
Cyclic (coal-tar) finished products[2]	106	270	290	330	360
Acyclic (noncoal-tar), synthetic[2]	173	607	791	684	621
Acyclic (noncoal-tar), other than synthetics[3]	25	200	275	175	69
Inorganic chemicals	413	869	984	998	979
Total	790	2,236	2,710	2,507	2,379

[1] Value of products manufactured for sale or transfer from producing plant.
[2] Does not include medicinal chemicals, color lakes and plastic materials.
[3] Largely ethyl alcohol, most of which is produced by fermentation

TABLE 5.—WHOLESALE PRICE INDEX OF SELECTED CHEMICALS, BY GROUPS, 1939=100.

Year	*Chemicals and Allied Products*[1]	*Basic Chemicals*	*Drugs and Pharmaceuticals*	*Fertilizer Materials*	*Mixed Fertilizers*	*Prepared Paints*	*Paint Materials*	*Rayon*
1939	100	100	100	100	100	100	100	100
1940	102	100	114	102	101	102	106	102
1941	107	103	131	108	104	103	120	103
1942	117	114	148	116	113	107	141	105
1943	117	114	136	118	118	107	147	105
1944	118	114	139	120	118	107	155	105
1945	118	114	139	120	119	107	160	105
1946	123	118	154	129	121	112	186	107

[1] Includes basic chemicals, drugs and pharmaceuticals, fertilizer materials and mixed fertilizers. Excludes prepared paints, paint materials, rayon and fats and oils.
Source: Bureau of Labor Statistics.

INDIVIDUAL DEVELOPMENTS

Developments in some segments of the chemical industry are discussed below:

Acids.—Output of sulfuric acid in privately operated plants reached a peak in 1945, slackening off in 1946. Lessened demands for aviation gasoline resulted in decreased production of anhydrous hydrofluoric acid.

Alcohols.—The large decrease in value of output of alcohols is directly due to a drop in production of explosives and synthetic rubber after the war. Beverage distillers ceased producing industrial alcohol in late 1945 and resumed their normal activity. High cost alcohol no longer was produced after withdrawal of subsidies.

Ammonia.—During the war, a considerable part of production of ammonia came from ordnance plants. After cessation of hostilities, some of these plants were sold or leased to private operators who have since produced ammonia and ammonium nitrate as fertilizer materials. The total amount of ammonia made in 1946 was considerably less than during 1945, when both ordnance and private plants operated at high levels during much of the year.

Calcium Carbide.—Output of calcium carbide continued to decline from the 1944 peak as demand for this commodity, source material for acetylene, for shipbuilding and other construction slackened. Growing importance of this chemical as the starting point for a series of organic products prevented a more rapid decline in demand.

SOAP SHORTAGE AIDS PHOSPHATES

Phosphates.—Output of sodium phosphates has been limited by amounts of soda ash available. Value of phosphates increased in 1946 over 1945. During much of 1946, shortages of fats and oils for soap forced the use of sodium phosphates as substitutes and extenders for soap.

Cleaning and Polishing Preparations.—Value of output of cleaning and polishing preparations rose in 1946 with the return to the market of many compounds which had partially or wholly disappeared during wartime. A new development in cleaning compounds was the widespread marketing of synthetic organic detergents for household use.

Compressed Gases.—Output of compressed gases reached a peak in 1944 and declined in 1945 and 1946. The reduction was principally in the various gases used in welding and cutting, e.g., acetylene,

oxygen, and hydrogen. Demand for both gaseous and solid carbon dioxide stayed at high levels during 1944, 1945, and 1946.

Explosives.—Industrial explosives showed a drop in value in 1946 from the 1945 figure, principally because of the sharp drop in production of smokeless powder in privately-owned plants after the cessation of hostilities.

Fertilizers.—Critical need for food throughout most of the world has brought about a peak demand for fertilizer. Increases in the value of output have reflected this growing demand from 1939 through 1946. A number of ordnance plants which formerly produced ammonia and other nitrogen products for munitions are now under private operation and are turning out nitrogen fertilizer products for use both in this country and abroad. Plant food content per ton of fertilizer has remained at a higher level than prewar, thus providing the same plant food in less bulk.

Insecticides.—Arsenicals, rotenone and pyrethrum-containing preparations, fungicides, household disinfectants, and DDT are included in this grouping. This last insecticide material came into large scale production in 1945 and added greatly to value of insecticides in both 1945 and 1946. Aerosol type insecticides reached the civilian market in large quantities during 1946.

New types of weed killers such as 2,4-D assumed commercial importance during 1946 and are expected to become more important in the future.

CONSTRUCTION BOOSTS PAINTS

Paints, Varnishes, and Lacquers.—The increase in value of paints and other protective coatings during 1943-46 over 1939 is due for the most part to greater volume of production, as paint prices generally remained constant from 1942-1945 at a level only slightly above 1939 and showed little additional increase in 1946. Shortages of pigments and raw materials, e.g., oils, limited increases in output of most protective coatings. Requirements for protective coatings for the armed services skyrocketed with the war and likewise civilian demands for maintenance of buildings increased. During 1946—with wartime limitations removed, military requirements sharply reduced, and oil more plentifully supplied—paint production mounted.

Plastics Materials.—Growth of value and volume of plastic materials continued in 1946 above that in 1945.

Polystyrene resins consumption and shipments in 1946 were more than double those in 1945—an example of the rapidity of plastics production growth. Silicone resins, a recent development, promise to permit use of plastic materials in many applications which heretofore had been only partially satisfactorily served by available materials. New developments, both in cellulose plastics and synthetic resins, insure continued growth in use and importance of all commercial varieties of plastic materials.

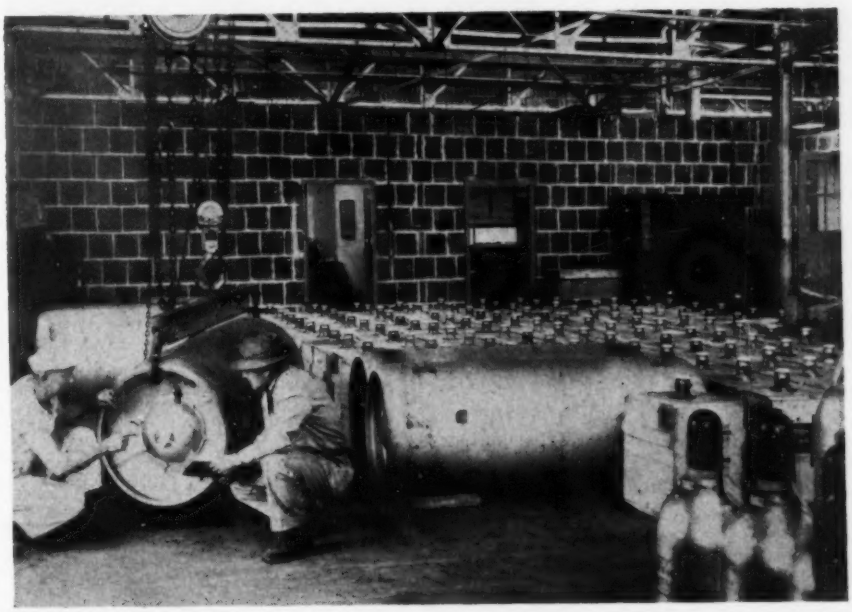
Critical food needs throughout the world have caused doubling of prewar fertilizer output.

Rayon and Other Synthetic Fibers.—Use of rayon increased markedly from 1939 through 1946. Most of the increases occurred in tire yarn. Introduction of nylon just before the war and the stoppage of silk imports after 1941 had far-reaching effects. Development of other synthetic fibers during the past few years has shown that man-made textile fibers will solve many problems. Synthetic fibers have invaded the realm of brushes previously monopolized by hog bristles, and now synthetic-fiber hair, paint, and tooth brushes have ceased to be novelties.

Soap and Glycerin.—Shortages of fats and oils in 1946 prevented an increase in soap output, but mounting prices of fats and oils for soap manufacture forced increases in prices, raising the 1946 value of soap and glycerin production to a level equal with 1945. Future volume of soap and glycerin production will be affected by several factors, among them being the supply and prices of fats and oils, and the volume and relative prices of synthetic organic detergents—fast becoming important competitive products.

1947 WILL BE HIGH

Fulfillment of peacetime needs during 1946 kept parts of the chemical industry operating in full swing, while other segments slackened their pace from wartime peaks to keep step with lessened demands. Operations of practically all branches of the industry were at much higher levels than in 1939. There is every expectation that output of basic chemicals and chemical products in 1947 will be nearly equal to that in 1946.



(Courtesy Pennsylvania Salt Manufacturing Co.)

Chlorine output climbed back to its wartime peak, after a slight drop in 1945.

Catalytic Hydrogenation Boosts SORBITOL OUTPUT

by HOWARD C. E. JOHNSON, Chemical Editor
Chemical Industries

UNTIL TEN YEARS AGO, when Atlas Powder Company started to make sorbitol by large-scale electrolytic reduction of glucose, this hexahydric alcohol was a rare, expensive chemical. Now a catalytic hydrogenation process has been developed which produces a purer product at lower cost. A $2,000,000 plant has been built to satisfy the large anticipated demand.

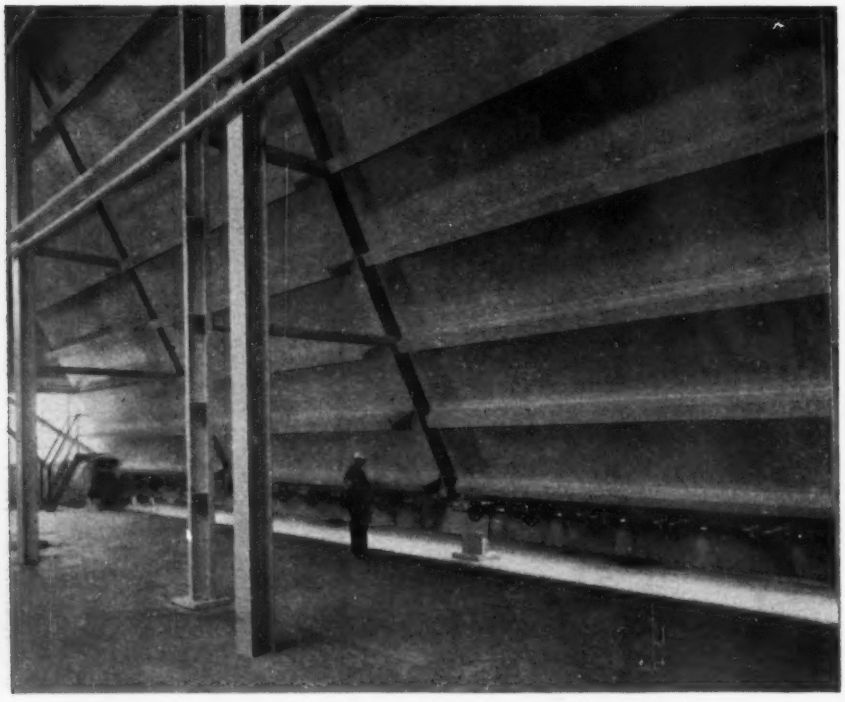
FAST-GROWING demand for sorbitol and its derivatives has made it necessary for Atlas Powder Company to expand its output of that polyhydric alcohol. A new plant, built at a cost of over $2,000,000, will provide enough capacity to permit tank-car sales.

It is fortunate, in one respect, that this expansion could not be undertaken during the war; for at that time the catalytic hydrogenation process, which is the basis of the new expansion, was only in the development stage. The earlier and still-used electrolytic reduction process is successful, but inordinately long processing time and degradation to lower-molecular-weight and colored by-products are drawbacks which the new process overcomes.

MOLECULES, NOT ATOMS

In either process highly refined *d*-glucose (corn sugar) is the raw material. Again in either process the addition of a molecule of hydrogen converts the sugar to the hexahydric alcohol:

$$HOCH_2(CHOH)_4CHO + H_2 \rightarrow HOCH_2(CHOH)_4CH_2OH.$$



Sugar silos for storing the raw glucose at the new sorbitol unit.

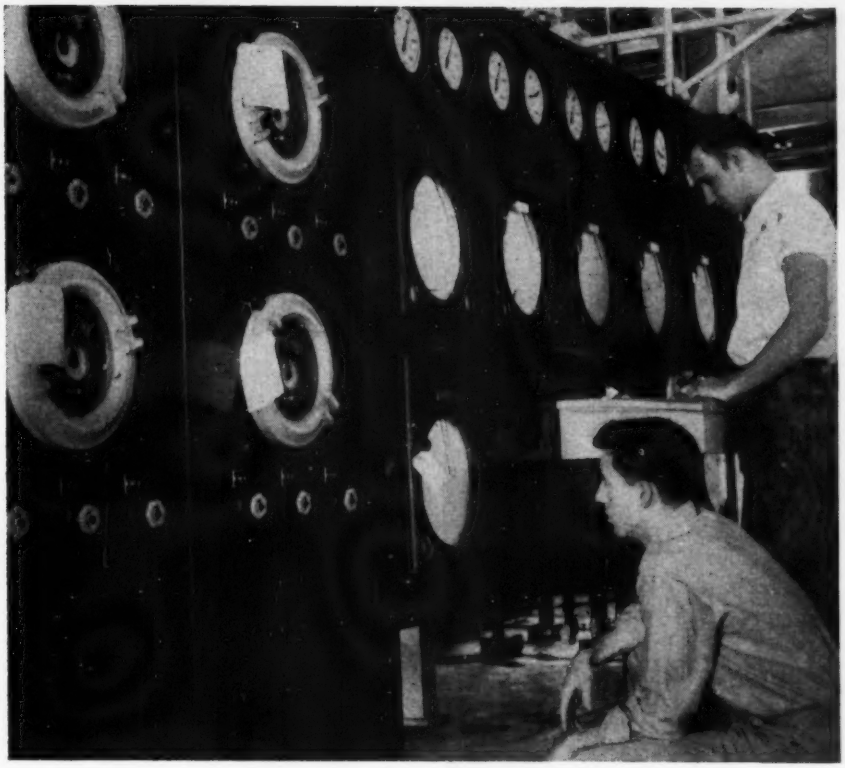
It is also possible in either process, by varying the reaction conditions, to produce minor proportions of mannitol, a stereoisomer of sorbitol. While mannitol has the same structural formula as sorbitol, its physical properties are quite different. (It is much higher-melting, less soluble in water and ethyl alcohol.) Because of its particular combination of properties, alone and in various esterified forms, it finds valuable use in food, pharmaceutical and drug fields. Thus far, however, the demand for mannitol has been much more limited as compared with sorbitol, on account of its different characteristics.

In the electrolytic process (*Chem. and Met. Eng., 44,* 588, [1937]) it is hydrogen from electrolysis that does the reducing—at slightly over room temperature and atmospheric pressure; but in the new process gaseous hydrogen is made to react with the glucose molecule at high temperature and pressure in the presence of a catalyst. Electrolytic reduction takes several days, while hydrogenation is a matter of hours. But a more serious disadvantage of the electrolytic process is the degradation of the product by alkalis required under some conditions. As a result, more intensive purification is necessary for certain uses, e. g., esterification.

RAW MATERIALS

In Atlas' new facilities at Atlas Point, Del., hydrogen is produced in a separate building. Coke and steam react to give water gas (H_2 and CO). This mixture then reacts with iron oxide to give steam, carbon dioxide and iron. Steam then reacts with the iron to give hydrogen and iron oxide. The process is so carried out that the net result is reduction of steam with iron to give hydrogen, and the water gas reduces the iron oxide formed in the primary reaction.

Crystalline *d*-glucose, meanwhile, has arrived in gondola cars. This is believed, by the way, to be the first bulk shipment of glucose in carload lots.) The sugar is carried by an Airveyor to the top of the processing building, where it is stored



Control panel inside autoclave building.

in three silos of an aggregate 1,000,000 lbs. capacity.

REACTION AND PURIFICATION

The sugar is dissolved in water, catalyst added, and the slurry pumped to the autoclave building, where it is hydrogenated at high pressure and temperature.

The sorbitol-water-catalyst mixture is returned to the processing building, where the catalyst, which is finely divided, is filtered off, rejuvenated and returned to the first step in the process.

The sorbitol-water filtrate is first demineralized by a Permutit ion-exchanger. The next step is decolorization with Darco activated carbon, after which it is evaporated to 70 per cent by a Swenson continuous evaporator constructed of Karbate.

After demineralization the product is handled like a food to avoid contamination. Materials with which it comes into contact are non-corrodible, storage is in stainless steel tanks, and shipments are made in tin-lined tank cars or lined drums.

EXPANDING MARKETS

Why sorbitol is being made and sold in tank-car quantities is a natural question. J. R. Frorer, general manager of Atlas Powder's Industrial Chemicals Department, provides some impressive answers.

Many large uses for sorbitol, both present and foreseeable, take advantage of its special physical properties. Because of its humectancy, high viscosity, water solubility, etc., it is a valuable conditioning agent in such products as tobacco, foods, cosmetics, pharmaceuticals, glues, printers' rollers and paper specialties.

All of the polyols, from ethylene glycol to the hexahydric alcohols, show a continuous variation of properties with molecular weight. Each of them—glycol, polyethylene glycols, glycerine, pentaerythritol, sorbitol, etc.—has its own special advantages and limitations; but Atlas believes that sorbitol is superior to, and will replace, other polyhydrics in many markets.

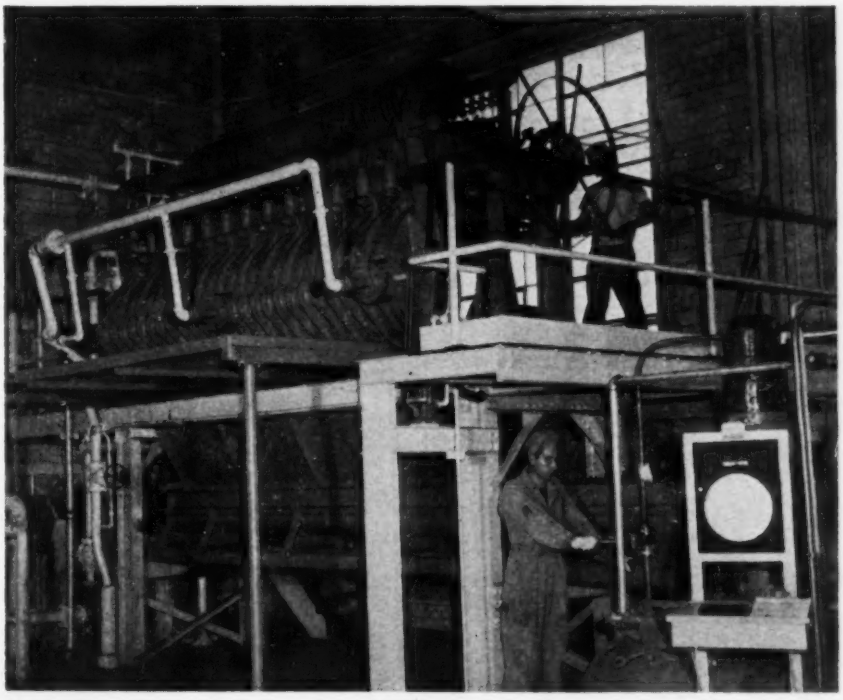
The properties of sorbitol are so far away from the glycols that it is practically non-competitive. Anti-freeze compounds, for example, are incontrovertibly in the dominion of the glycols. Sorbitol, therefore, is competitive chiefly with glycerin and pentaerythritol.

Glucose itself is, of course, a polyhydroxy compound. Why all the bother then, of reducing glucose to sorbitol? Simply because the sugar is too unstable, too sensitive to the many indignities it would be subjected to. Hydrogenation to sorbitol is just a convenient way to "plug up sugar's weak spot," as Mr. Frorer puts it.

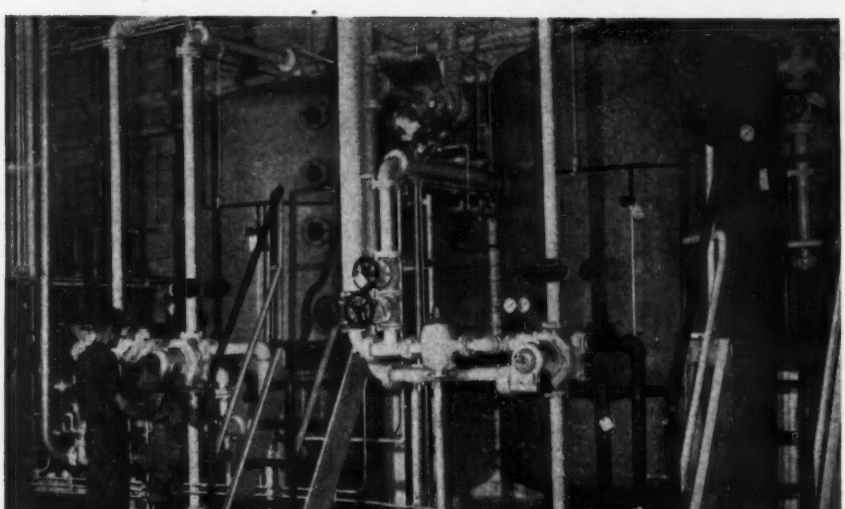
SURFACE-ACTIVE AGENTS

In many of its uses sorbitol is not merely a bundle of desirable physical properties but a reactive chemical. Major of these uses is esterification with fatty acids (and also, optionally, addition of alkylene oxides) to form surface-active agents. Production of these agents—marketed by Atlas under its trademarks Span, Tween, Arlacel, etc.—accounted for the major portion of Atlas' sorbitol output before the recent expansion. Embracing a wide range of properties, these agents are custom-designed to solve an equally wide range of emulsion problems.

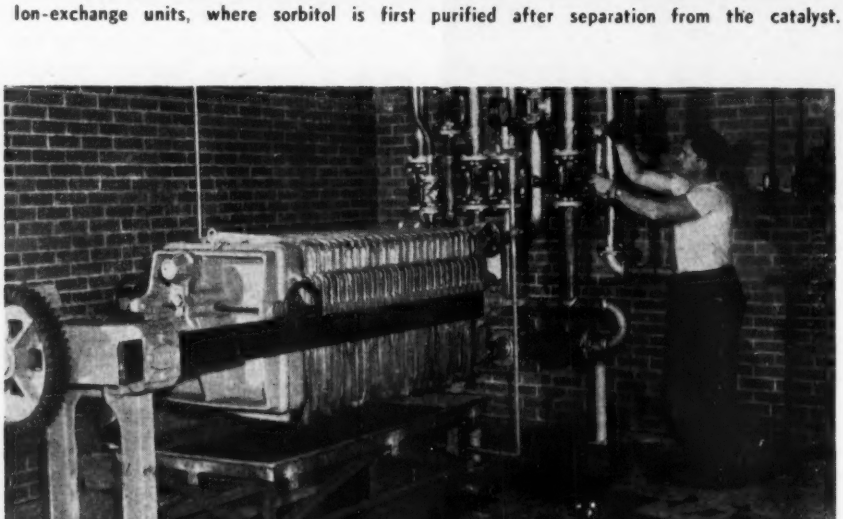
It is in food products—because they are non-toxic and are actually foods themselves—that the Spans share a special niche with glyceryl monoesters to the virtual exclusion of other emulsifiers; and Atlas claims that the Spans are



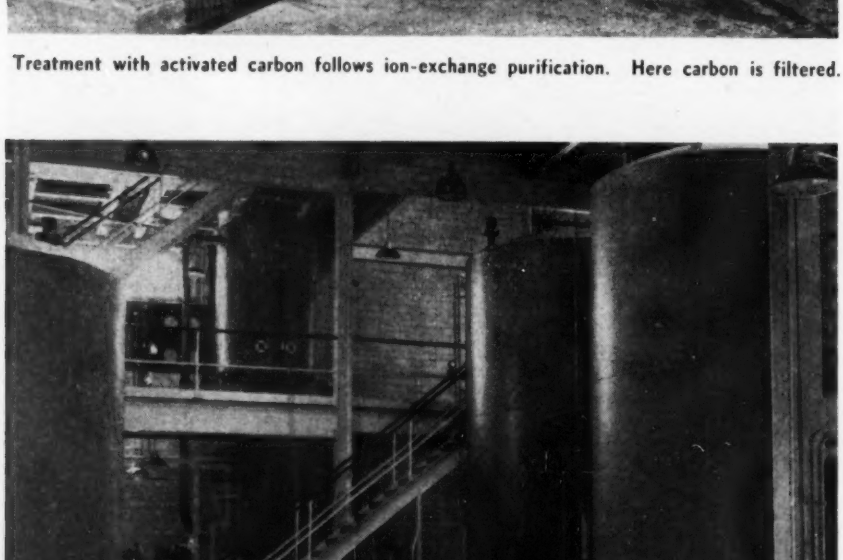
After reduction of glucose to sorbitol in the autoclaves, the sorbitol solution is separated from the catalyst in this filter press. At right are nitration tanks for catalyst treatment.



Ion-exchange units, where sorbitol is first purified after separation from the catalyst.



Treatment with activated carbon follows ion-exchange purification. Here carbon is filtered.



Evaporation section: Storage tanks are at right, evaporator in background, weigh tanks at left.

considerably more effective, pound for pound, than the glycerin derivatives.

ALKYDS LOOMING UP

Still in the development stage but showing definite promise are sorbitol resins, drying oils and plasticizers. These, of course, come athwart the corresponding glycerin and pentaerythritol derivatives.

At the moment glycerin is deceptively high priced, and P. E. has won a large market. Pentaerythritol has a momentary advantage over sorbitol, for its use in resin production has been studied during several years of intensive research. But the chemical and physical properties of sorbitol suggest superior characteristics for the manufacture of certain resins. An example: In chemical reactions—in making Spans and Tweens, for instance—sorbitol loses one or two molecules of water and forms monocyclic or bicyclic ethers. The same thing happens in alkyd formation and confers better flexibility, water resistance and adhesiveness on the resin. Sorbitol resins are also said to be more compatible with nitrocellulose, vinyls and urea-formaldehydes than those made from pentaerythritol.

More research by, and education of, resin manufacturers is necessary to develop sorbitol resins to the fullest extent. Dehydration can go too far, for example, unless rigid control is exercised. But Atlas is confident that a sizable market for sorbitol alkyds and other resins exists—after they have had as much study as has been expended on competitive polyhydrics.

STILL CLIMBING

The new Atlas plant is the most recent step on sorbitol's staircase, but, judging from past history, it may not be the last one. After the first plant was built in 1937, output was increased, first by upping process output 50 per cent, and second, by crowding more equipment into the existing buildings. Then, in 1942, the buildings were enlarged and a catalytic hydrogenation pilot plant was built. This unit, small as it was, accounted for nearly as much as the entire original electrolytic units.

When the present expansion was undertaken, Atlas needed more than new buildings and new equipment. Water capacity, power and other utilities had to be expanded as well. Higher sorbitol demand was likened by A. L. Churchill, assistant plant manager, to the last straw upon the camel's back. Now Atlas has practically a new camel.

Twenty-five years ago glycerin was the only commercially available polyhydric alcohol. Then came glycol, the polyglycols, polymethylene glycols and pentaerythritol. Now sorbitol has become a major contender, and today's chemist can add it to his list of materials to choose among for the right one to do his particular job.

Trade Names are Tricky

by JOHN R. HOOVER, Vice-President, Sales,
B. F. Goodrich Chemical Co.,
Cleveland, Ohio

HOW TO ASSOCIATE A COMPANY NAME WITH ITS PRODUCT is an especially knotty problem in the chemical field, where products are so diverse and their proper names so complex. Here is a case history of one company's attack and solution of the trade-name dilemma.

WHEN ALL the chemical materials, manufacturing and sales activities of The B. F. Goodrich Co. were gathered into one unit several years ago, the result was the Chemical Division, now B. F. Goodrich Chemical Co.

We had several initial blessings, and some tough problems which occur only when a new company is organized from scratch and starts out to do business in established fields. One of the blessings, of course, was the rare opportunity for a comparatively few of us to start with fundamentals and rapidly build a new organization to manage an already established and expanding busines. We all had ideas—and ideals—for management, and were able to institute some new things we had always planned.

BUT HEADACHES TOO

The headaches were numerous, too, and I want to concentrate on just one: trade names.

The situation we faced was this: We were charged with responsibility of continuing and enlarging the sales of a few chemical and vinyl resin products which had been manufactured by B. F. Goodrich for some time. All these products were transferred to a new company and in some cases were being offered to new fields, but were known by trade names identified with and belonging to the parent company. So we had to have new names, and we had to make them stick.

Our immediate task was to name our polyvinyl raw materials: polyvinyl chloride resins and our plastic compounds based on the various resin series. After seemingly endless trade-name searches and considerable internal debate, we selected the name Geon (with a *soft* "G," please). We immediately started our advertising and promotion programs to identify the new name with the new organization, and set about the job of printing all of our literature and data, containers and office forms incorporating the new name.

It took time and money, but a start, at least, was made.

Then we had another problem. We acquired the trade-name Hycar and the product it identified, a butadiene-type rubber, and added it to our operation. That gave us Geon polyvinyl materials and Hycar American rubber, and so far things weren't too confusing.

Before the ripples had subsided in the sales groups, we had another decision to make: Research turned over to us a new thermosetting, casting material, an allyl ester monomer; we had to have another name, and immediately. We settled on Kriston, and all went well.

Our fourth and major trade-name problem was hatched when the decision was made to market broadly a group of organic intermediates which heretofore had been sold only to the rubber industry. We had to have more names, and the debating began.

We assembled, not once but many times, our so-called policy group, a name much more formal than the group itself. This little debating society was composed of all officers and managers of the sales and advertising functions and since we know each other well, we let our hair down. First of all, we faced a problem in that our company and its list of products was growing rapidly and branching into many divergent fields. In the near future, we would have a list of resinous and chemical materials as long as a boardinghouse arm and, presumably, would need names for all of them. Such materials as polyethylene polysulfide, 2-aminoethyl sulfuric acid, 2-thio-4-keto-thiazolidine and polymerized trimethyldihydroquinoline didn't seem to led themselves under those names to quick identification as B. F. Goodrich Chemical Co. products. On the other hand, if we allowed our list of trade names to grow like Topsy, it wouldn't be too long before we would be saddled with cumbersome and, for the most part, meaningless list of miscellaneous names which would be difficult or impossible to merchandise properly.

"We assembled . . . our . . . little debating society . . . and since we know each other well, we let our hair down."

After considerable internal stressing and straining, we evolved an idea which probably won't win medals for originality, but which seems to work for us—so far.

THE ADJECTIVE CONCEPT

Under the broad conception of the new trade-mark act, in effect this July, trade names identify only the source of the product but not necessarily its specific nature. Therefore, all trade names automatically become descriptive adjectives and cannot be protected unless they are used as adjectives. Using this conception as a premise, we revamped all of our trade-name ideas.

Geon is now an adjective describing not only all the forms of polyvinyl materials produced by our company, but in the future will be the name identifying *any thermoplastic* material we may produce. Geon, then, will identify all of our thermoplastics, regardless of differing chemical natures.

Hycar now identifies all of our American rubbers or vulcanizable elastic materials, and is no longer restricted to butadiene types.

Kriston in the future will identify all thermosetting plasics materials, including, but not restricted to, the allyls.

For our growing list of chemicals, we had to further define and refine this policy. All of our chemicals in the future will be known as Good-rite chemicals, and with the trade name will appear the full chemical name, such as Good-rite polyethylene polysulfide, Good-rite 2-aminoethyl sulfuric acid, etc. We believe this system will not only allow us to expand our list of chemicals indefinitely, but will be a real service to purchasers by identifying specific source and specific material simultaneously. A quick reference to the existing trade marks covering chemicals will illustrate the amazing variety of coined, unintelligible names used to identify different manufacturers' products.

We will undoubtedly have many questions to debate and decide, but at least this much is already clear: We can keep our trade names to a minimum and thus do a better job of identifying and protecting each one.

Pricing New Products for Maximum Profit

by ROGER WILLIAMS, JR.
E. I. du Pont de Nemours & Co.
Wilmington, Delaware

THE DECISION ON WHETHER OR NOT TO INVEST, and the price to be charged for a new product are too often based on insufficient and improperly presented economic data. Proper use of the "break-even" chart and its variants will provide the information required.

THE current emphasis on research and the great number of new products coming out of research laboratories have put a major burden on managements to determine which of the new products are worthwhile ventures and which should be cast aside as not being economically sound. New techniques for measuring new product acceptability have been developed but these market analyses must be correlated properly with estimates of investment cost and operating cost before management can make sound decisions on whether or not to invest in a product, what the initial plant size should be, and what program should be visualized for the future of the new product. It is in the development of this information that the economic analyst comes into play.

Formal economic analyses of new products are usually made as development reaches the stage of requiring a pilot plant and again at the time when a commercial plant must be considered. The purposes of such analyses are, of course, to lay sufficient economic data before management that intelligent decisions can be made regarding the future of the new product. Unfortunately, all too often the data presented are too meager or are presented in such a way that management is not armed with adequate information. This article presents two of the shortcuts used by the writer to correlate and present economic data so that they are as complete and useful as possible.

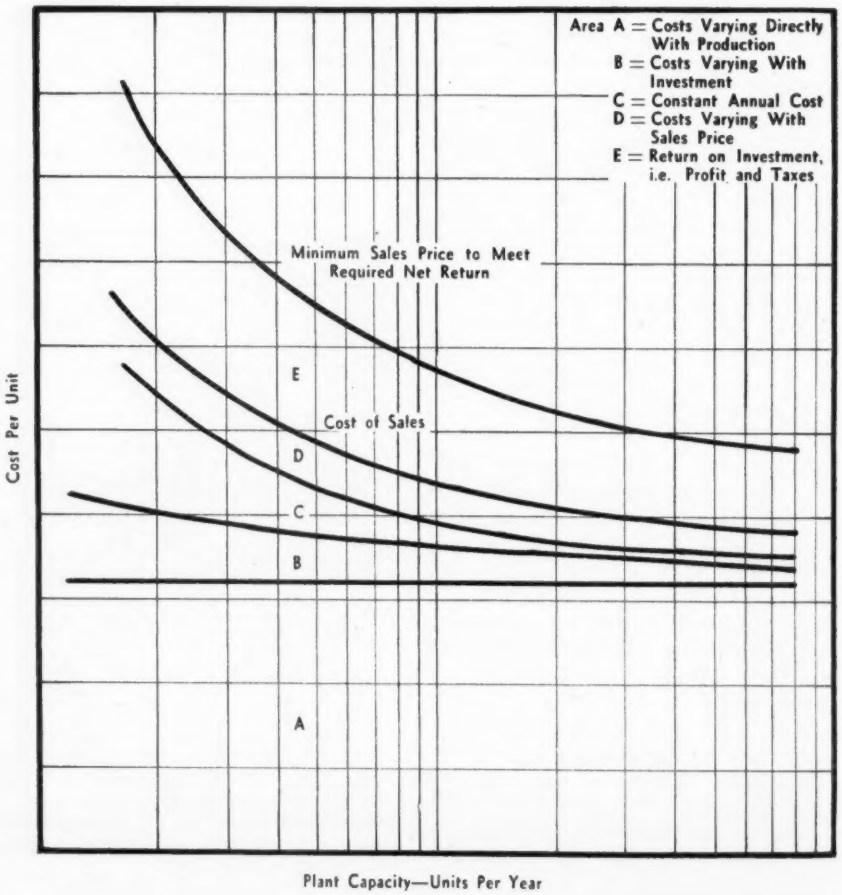
THE ECONOMIC ANALYSIS

The economic analysis often made consists of taking a flow sheet, choosing a plant capacity, calculating the necessary equipment, estimating investment and production cost at capacity operation, and, finally, estimating either (1) the sales price that will net the company the minimum return it desires on capital investment in new products, or (2) the sales price that will give the minimum desired profit as a percent of sales. Too often the formal economic report stops there and management must decide whether or not to go on with the new product solely on the basis of this information, supplemented with the views and opinions of others in the organization.

The figures derived in the above manner are useful, but they fail to present the effects of two variables which should be known by management before a sound decision can be reached. The first of these is the variation of the cost of the product with size of plant; tied with this should be the minimum sales price to achieve a satisfactory return on the investment. Such information is basically necessary before a satisfactory choice of initial plant size can be made. The second variable is the effect of operation at less than capacity for any given plant size. This factor has its greatest meaning where a choice must be made between two competitive processes for manufacture of the same product. It also can affect greatly the initial plant size chosen.

The first variable mentioned above, cost at other than one plant size, can be rather simply obtained by modification of the original estimate. This is done by splitting operating cost and investment into items that (a) are constant regardless of production capacity, (b) vary directly with capacity, (c) vary with the sales price, (d) vary with the cost of sales, and (e) vary to the 0.6 power of the change in production capacity. The last, (e), covers items of permanent investment which vary in size as plant capacity is varied and do not require duplication of units. The 0.6 factor is a rule-of-thumb which says that if a unit is to be made x times the capacity of a known unit, it will cost x0.6 times the cost of the known unit[1].

Fig. 1. Plant Size vs. Product Cost.


Area A = Costs Varying Directly With Production
B = Costs Varying With Investment
C = Constant Annual Cost
D = Costs Varying With Sales Price
E = Return on Investment, i.e. Profit and Taxes
Minimum Sales Price to Meet Required Net Return
Cost of Sales
E
D
C
B
A
Cost Per Unit
Plant Capacity—Units Per Year

Representative cost items included under the five groupings outlined above are shown in Table I. The proper mathematical manipulation of these five parts of the estimate will give a complete cost of sales, investment, and cost-plus-return analysis over a wide range of production capacities with a degree of accuracy well within that of the basic information. The limits are, on the low side, where batch operation becomes more economical than continuous operation and, on the high side, where the largest practical unit size is reached.

An illustration of the type of curve obtained from such a calculation is shown in Fig. 1. The illustration used happens to be one in which ingredients bulked large.

TABLE I — COMPONENTS OF OPERATING AND INVESTMENT COST

	Cost of Sales	*Investment*
1. *Constant Regardless of Production Capacity*	Operating Labor Overhead (portions)	
2. *Varies Directly With Plant Capacity*	Ingredients Purchased Services Packaging and Shipping Labor Quality Control Maintenance on Multiple Units	Inventories Permanent investment where multiple units are required
3. *Varies With Sales Price*	Selling Expense Sales Tax	Accounts Receivable Deferred Charges
4. *Varies With Cost of Sales*		Cash
5. *Varies to 0.6 Power of Change in Capacity*	Depreciation Property Taxes Maintenance on Non-multiple Unit Investment	Permanent investment where multiple units are not required

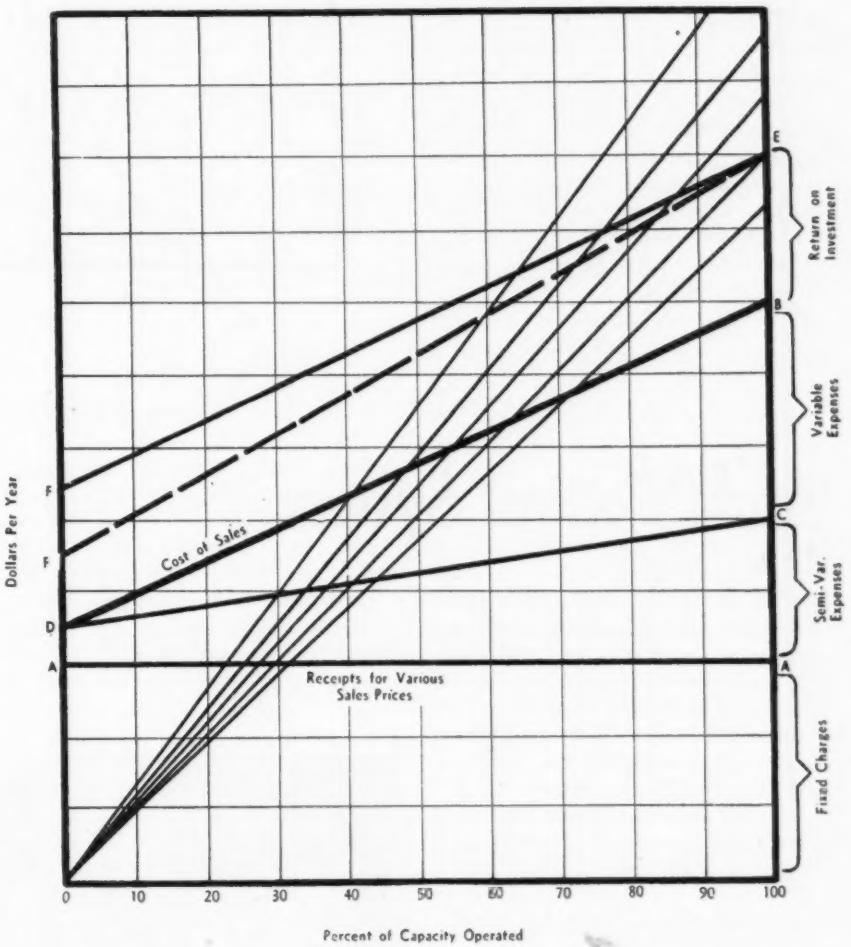
THE "BREAK-EVEN" CHART

The second set of data, cost of operation at less than capacity production, is generally derived by construction of a so-called "break-even" chart. Although such charts have been discussed widely in the past, a brief review of their aims is perhaps valuable before presenting the few short-cuts which have been developed. These short-cuts greatly simplify the construction of the chart and still maintain sufficient accuracy to draw sound conclusions from the resultant chart. An excellent discussion of "break-even" charts can be found in Bullinger[2] and the reader is referred to his book for a detailed description of this type of presentation.

The "break-even" chart plots the cost of manufacturing and selling a product against the percentage of the plant capacity which is utilized. A secondary factor which is then brought in is return on investment, or profit, that can be expected from various selling prices when the production rate is lower than full capacity. The term "break-even" indicates, for a given sales price, the percentage of capacity that must be operated to keep from losing money.

The first job in building a "break-even" chart is the development of the cost of sales for various production rates less than capacity. To do this it is first necessary to realize that there are three basic types of expense that go into operating a chemical plant. The first of these is fixed cost, in other words annual dollar expenditures that do not vary with the plant output. Depreciation, property taxes, and property insurance are illustrations of this tye of expense. The second group is the opposite extreme, costs which vary directly with the poundage which is produced from the plant. In general these costs are the purchased items such as ingredients and purchased services which are bought only as need for them dictates. The third group consists of items which fall between the two extremes and might be called semi-variable with production. Labor, maintenance, supplies, selling expense, and management expenses are typical items in this group.

Fig. 2. Derivation of the "Break-Even" Chart.



BUILDING THE "BREAK-EVEN" CHART

The following, together with Fig. 2, outlines the procedure in building the "break-even" chart. In the method outlined below it is assumed that an estimate has been made of the cost of sales and the total investment required when the proposed plant is operated at full capacity. The first step is to break down the estimated cost of sales for full capacity into its three component groups, discussed above. Table II shows this breakdown:

TABLE II — COST OF SALES ITEMS

1. *Fixed Expenses*
   - Fixed Charges on
     - Direct Plant
     - Allocated Share of Services Investment
     - Allocated Share of General Facilities
2. *Completely Variable Expenses*
   - Purchased Ingredients
   - Purchased Services
3. *Semi-Variable Expenses*
   - Labor and Supervision
   - Maintenance
   - Supplies, Chemical Control, and Misc.
   - Selling Expense
   - Management and Research

Turning to construction of the chart itself (see Fig. 2) the outline is first made with percent of plant capacity operated as the abscissa and dollars per

year as the ordinate. Certain figures can be plotted directly from the data available. Points A represent the fixed charges.

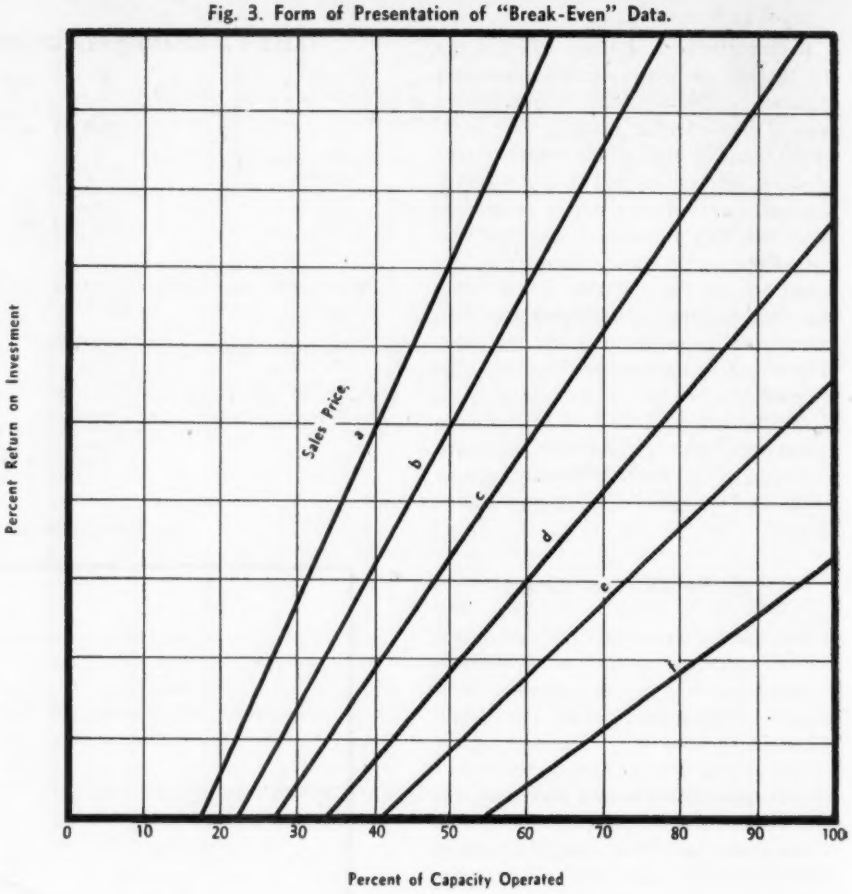
Point B represents the total cost of sales estimated for full capacity operation. Subtracting the completely variable expenses from the total cost of sales plots point C (the sum of fixed charges and semi-variable expense) and hence the distance A-C represents the semi-variable expense.

At this point a short-cut is introduced. Work with these charts on such widely variable products as plastics and large scale, basic chemicals such as ammonia has developed the rule-of-thumb that it requires one-fourth to one-third the semi-variable expense calculated for full capacity to operate at all, i.e., at essentially zero output. This allows point D to be plotted, the distance A-D being one-fourth to one-third A-C. It is certainly true that semi-variable costs decrease in a more step-wise fashion than this construction indicates but the loss in accuracy is small and probably well within the limits of accuracy of the basic data. The line B-D then represents the product cost, or cost of sales, for operation at less than rated capacity since completely variable cost must, by definition, fall to zero when no product is made.

The analysis at full capacity developed

(*Turn to page 682*)

Fig. 3. Form of Presentation of "Break-Even" Data.



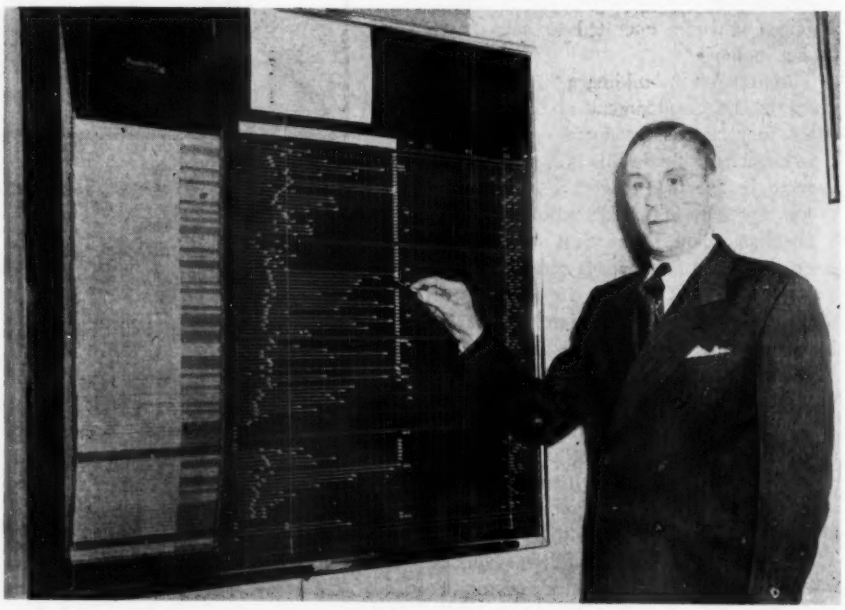
Visual Control System

TO FACILITATE and make more efficient its handling of orders and management of inventories, the Springfield, Mass., plant of Monsanto Chemical Co. has adopted the visual (board) control system which was largely an outgrowth of war production and which has been developed and improved for peacetime use.

The visual board system, Monsanto finds, gives management an instant picture of the state of inventory by items, quantities, etc., and provides facts which will help forecast shortages and thus make it possible to take steps that will avoid "outs" and delays in order filling. Also, the status of orders is posted by clerical help in far less time than it takes to dig out the facts from file or book records.

Operation of the visual control board is simple. A visible card index is located at the left side of the board. It is used to hold the permanent card records of the items under control. Corresponding to each card packet in the visible index is a peg attached to a cord which pulls out so that it may be extended from left to right on the board as needed. A "today line" is attached vertically to the board and is moved daily in accordance with the time element in the procedure.

The board provides at a glance all pertinent facts and figures. It automatically eliminates from management's attention situations which are in a normal condition and spotlights the bad points, thereby reducing the amount of time necessary to make an analytical report. It flashes the facts to all interested parties at one time, is flexible and can be adapted quickly to any problem. It eliminates or greatly reduces, according to the users, the amount of time necessary for the accumulation of usable facts from a routine paper record.



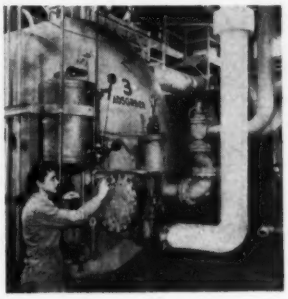
The visual control board is used by Monsanto to keep constant check on inventories and orders.

A CI REPORT ON

SEPARATION by ADSORPTION

Its Current Status and Applications

EDITORIAL STAFF



ADSORPTION AS A METHOD OF SEPARATION is already in broad use in the chemical process industries, but the advances represented by Union Oil's new Hypersorption process, first used on a commercial scale by Dow this year, may well extend its application to many other materials. The process also appears to be stimulating new interest in adsorption in general in the chemical field. The following report summarizes briefly the current status of commercial adsorbents, adsorption techniques and their range of applications in the process industries.

WHAT is probably the most important single advance in the development of the unit operation of adsorption was marked by the successful completion of the first commercial continuous adsorption fractionation unit by the Dow Chemical Co. at Midland, Mich. this spring. Two major steps are involved in this advance: (1) the addition of a rectifying section to the adsorption system to achieve closer separations and (2) the engineering of a truly continuous operation in contrast to the previous batch systems.

These developments have served to direct new interest toward adsorption in general in the chemical processing field, and it is the purpose of this report to summarize briefly the current status of commercial adsorbents, adsorption techniques, and their applications in chemical separations.

Up until the Dow installation the use of adsorption has been confined to relatively simple separations of fluids where no close fractionation or rectification is required and usually where the component to be removed exists only in small proportions.

Thus adsorption from the vapor phase has found its greatest use in the purification of gases and vapors, as in the drying of gases by activated alumina or silica gel, the recovery of natural gasoline by the Burrell process, the recovery of organic solvents and, as carried out in Europe, the recovery of benzene from coke-oven gas by the employment of activated carbon.

Adsorption from the liquid phase is utilized both for recovery of pure materials and for the removal of very small quantities of impurities. In the recovery of pure materials it is primarily confined to materials of relatively high unit value which cannot be satisfactorily separated by other less expensive means. Products in this category that have been or are being recovered include gold, penicillin, streptomycin, and iodine. The major use of adsorbents for the purification of low unit value products in the liquid phase has been for the removal of small quantities of color bodies or odorous constituents, as in the decolorization of sugar solutions and certain petroleum fractions.

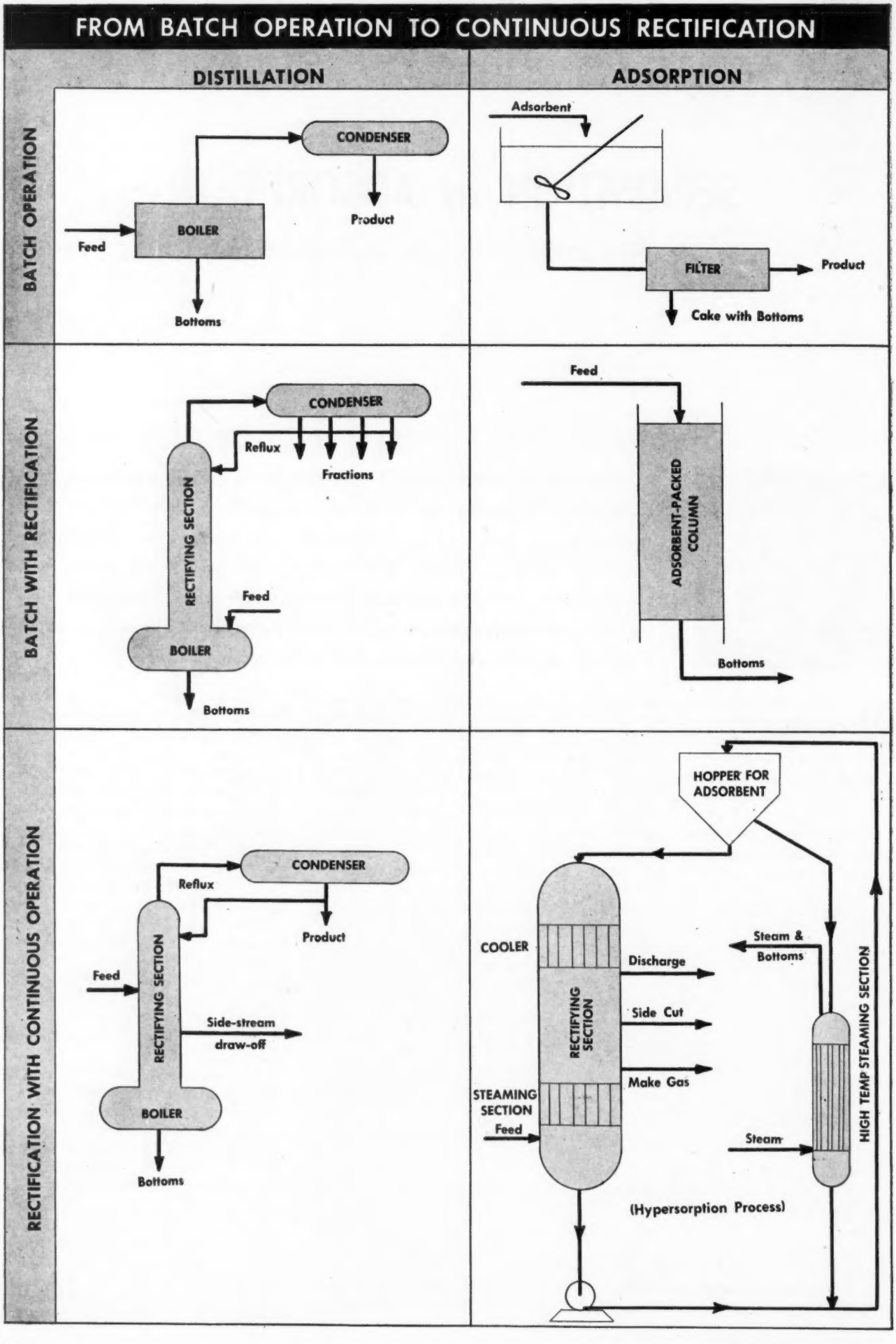
WHAT IS ADSORPTION?

In the 160 years since its discovery, adsorption has been defined in a variety of ways. Basically, however, it may be said that it consists of the concentration of one or more components of a fluid system, either liquid or vapor, at the surface of a solid. It is this peculiar ability of certain solid materials to concentrate relatively large quantities of an individual component or series of components that has been applied to industrial separation processes.

Adsorption on the surface of a solid may be visualized as taking place in three steps. First, there is the formation of a uni-molecular layer of the adsorbate (material being adsorbed) at the surface of the solid. This is followed immediately by the formation of a second layer, the thickness of which will depend on the attraction existing between the adsorbent and adsorbate, this attraction usually being considered a function of the van der Waals forces which lead to the major portion of the deviation from the ideal gas laws. The third step is the collection of a more or less "condensed" body of liquid in the submicroscopic openings which exist in the surface of the adsorbent. Chronologically these effects follow one another so closely that it is practically impossible to tell where one begins and the other ends.

In addition to purely physical or van der Waals adsorption, there is another type, usually termed chemisorption. As suggested by the name, this type involves a chemical reaction between the adsorbate and the surface of the adsorbent. Upon elution, or desorption, the material being adsorbed is not all recovered in the form in which it was first adsorbed. Obviously, adsorption of this type plays a very im-

FROM BATCH OPERATION TO CONTINUOUS RECTIFICATION



portant role in the catalysis of chemical reactions.

Still a third type is intermediate between true physical adsorption and chemisorption and has been termed persorption. For example, it has been found that when the water of hydration of the zeolite known as chabasite ($CaAl_2Si_4O_{12}6H_2O$) is driven off, the chabasite will take up large quantities of such small molecules as methanol and ethanol, while larger molecules such as benzene, ethyl ether and acetone are excluded. Here is a true molecular "sieve," as the molecules appear to be excluded or persorbed on only one basis, their size. The probability that a chemical reaction takes place is indicated by the fact that persorption is always accompanied by a greater evolution of heat than physical adsorption, although usually a smaller evolution of heat than chemisorption. It is believed that the persorbed molecules assume the place of the water of hydration in the crystal lattice. There are no known commercial applications.

Of these three types of adsorption, only physical adsorption is covered in this report.

SELECTIVITY

In general the degree of attraction between the adsorbent and the adsorbate in vapor phase adsorption is a direct function of the boiling point of the material being adsorbed: the higher the boiling point the greater the degree of attraction that exists. There are many exceptions to this rule, however, as the chemical nature of the adsorbate has a great deal to do with the order in which different materials are adsorbed. For example, polar adsorbents such as silica gel or alumina preferentially adsorb polar vapors such as water, while non-polar adsorbents such as activated carbon preferentially adsorb non-polar substances such as hydrocarbons. Thus, if it is desired to remove a hydrocarbon from a steam-hydrocarbon mixture, activated carbon is used to perform the separation by removal of the non-polar hydrocarbon. If removal of the water is desired, silica gel or alumina is used to adsorb the polar water molecules.

In adsorption from the liquid phase, the concentration of the adsorbate in the surface layer is a function of the surface tension. This function has been expressed mathematically by Gibbs, who states that if the surface tension of a solution increases with increasing concentration of the solute, the tendency will be toward elution rather than adsorption. Conversely, if the surface tension decreases with increasing concentration of the solution, the tendency will be toward increasing concentration at the surface, or adsorption.

This relationship is the basis of one of the common methods of regenerating adsorbents. The adsorbent containing the adsorbate is simply placed in contact with a liquid in which an increasing concentration of the adsorbate will tend to increase the surface tension. Under such conditions the adsorbate will tend to go into solution, that is, be eluted from the adsorbent, resulting in regeneration of the adsorbent so it can be reused. The other common method of regeneration is stripping of the adsorbate from the adsorbent by steam.

DISCOVERY

The physical phenomenon of adsorption is not a recent discovery nor is its commercial application a product of our times. However, recent advances have made the new continuous adsorption fractionation installations as different from the earlier batch and semi-batch methods as modern continuous distillation units are different from the simple pot stills of early times.

The discovery of adsorption is generally attributed to the famous Swedish chemist, Scheele, in 1773. The operation found its first use in the years following 1785 when wood charcoal was used for the decolorization of tartaric acid prior to crystallization and for the improvement of both odor and color of "rotten" wines. Chars are still used for wine purification. The use of bone charcoal for the decolorization of syrups came to the fore in a rather curious manner about 1811 when Figuier, in attempting to prepare a shoe blacking out of honey, wine, vinegar and bone charcoal, discovered that animal chars decolorized honey better than the existing vegetable chars. This discovery was subsequently extended to other syrups.

All uses before 1854 were for the purification of fluids in the liquid state. In that year, however, Stenhouse made a successful installation for deodorizing the gas discharged in the ventilation of sewers. He is also credited with the first use, in 1872, of chars in respirators for the protection of workmen in contact with mercury vapor, acid vapors and chlorine. These Stenhouse masks were the forerunners of the modern gas mask.

MODERN CHARS EMERGE

The Russian scientist, Ostrejko, is credited with the discovery, in 1900, leading to the type of activated carbon that is in use today. He produced his carbons by the dry distillation of vegetable matter at a bright red heat with the simultaneous action of superheated steam or carbon dioxide. He also recognized the value of adding various metal chlorides to the vegetable matter before carbonization to increase the activity of the final char.

Éponit, a wood charcoal introduced in Europe in 1909, is believed to have been the first commercial vegetable carbon used for sugar clarification. Several similar carbons were put on the market in the ensuing years, the most important being a product called Norit, produced by the General Norit Co. of Holland. The North American Norit Co., of Jacksonville, Fla., produces a char from pine stumps which is still sold under this trade name. It is a direct descendant of the original Dutch company.

U. S. DEVELOPMENT

The earliest commercial carbon in the United States appeared in 1916 under the trade names Filtchar and Retchar. After various improvements this product in 1923 become known as Nuchar. Nuchar is now produced by the Industrial Chemicals Division of the West Virginia Pulp and Paper Co. from waste sulfite liquors. The carbons marketed under the trade name, Darco, and produced by the Darco Co., a subsidiary of the Atlas Powder Co., came on the market in 1921. Although produced from a certain type of lignite found in the area around Marshall, Texas, Darco is usually classified structurally as a vegetable char.

The previously noted carbons are primarily for adsorption from the liquid phase. The production of carbons for vapor phase adsorption was insignificant prior to the mass of work completed during World War I which led to the selection of coconut and other nut shells and fruit pits as the best raw materials for the production of gas mask carbon. After the war this development was continued by the National Carbon Co., which began its manufacture of gas-adsorbent carbon at Cleveland, Ohio, in 1919 along with a carbon which is utilized for the purification of liquids.

Similarly, work completed during World War II has been carried forward by another organization for the production

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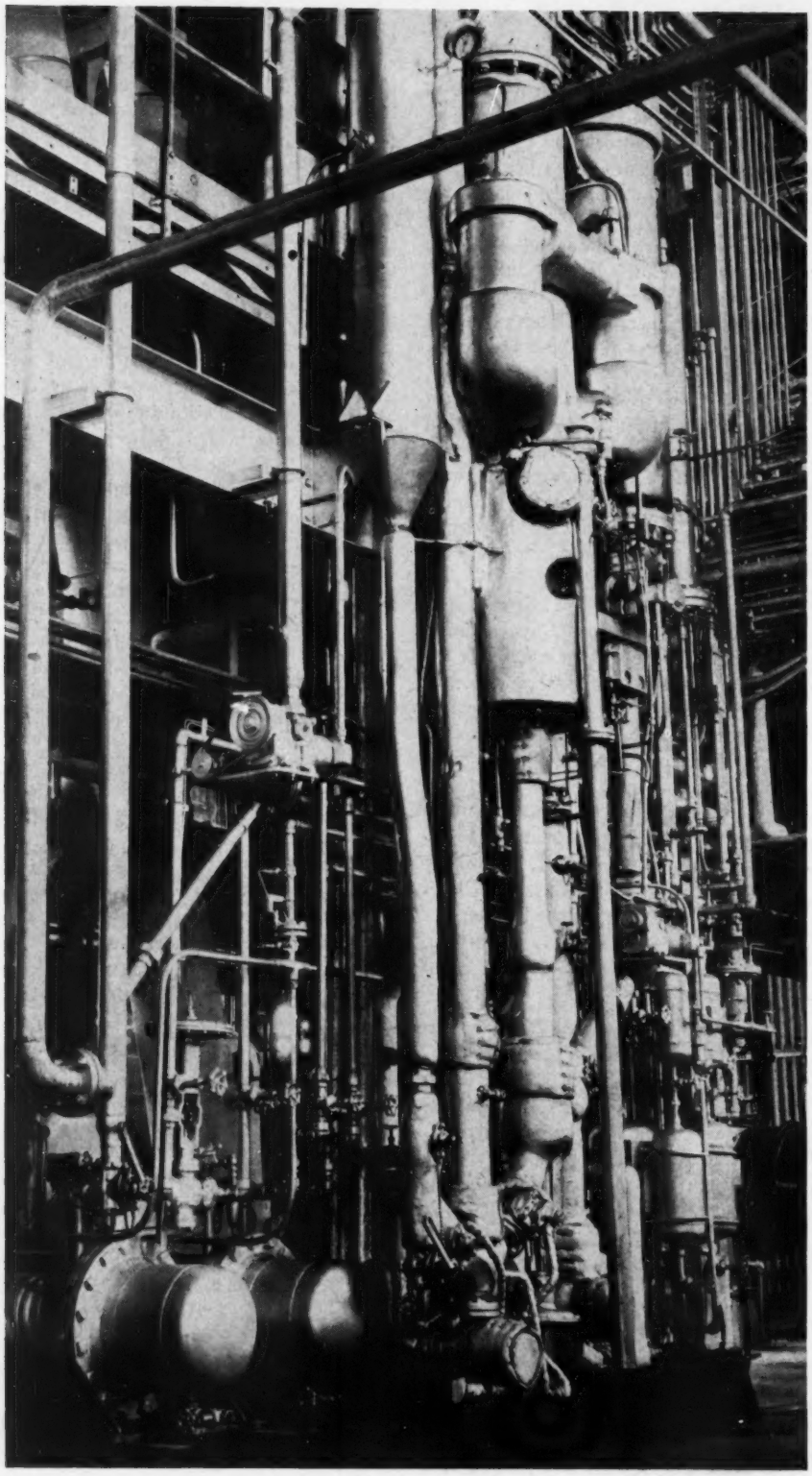
The development of adsorption as a method of separation may be considered as analogous to the development of distillation.

In both cases the operation was originally carried out in a simple batch unit. After many years, rectification was added and close fractionation became possible. In the case of distillation this was done by adding a packed or bubble plate column to the still kettle. In the case of adsorption it involved the use of an adsorbent-packed column to obtain chromatographic separation, which gives a rectification effect.

The third and final step in both cases consisted of operating the column or tower continuously with a constant feed and constant drawoff of product. In distillation this step is represented by the large continuous fractionating columns now used in many petroleum and chemical plants. In adsorption it is represented by the newly-developed Hypersorption unit of Union Oil Co. of California. A Hypersorption unit differs importantly from a continuous distillation column only in that a reflux of solid adsorbent is substituted for a liquid reflux.



Hypersorption pilot plant at Union Oil Co. of Calif. Large column at top center carries cooling, adsorption and stripping sections. At left are carbon return pipe and activator.

of activated carbon from bituminous coal. The Japanese invasion of the Philippines and the East Indies cut off a major portion of the supply of shells for the production of coconut char, making it imperative to provide another source of carbon, preferably domestic. Activated carbon produced from bituminous coal by the Pittsburgh Coal and Coke Co. took up the slack. One reported disadvantage of this product for continuous operation, however, is the rather friable nature of the carbon produced.

CARBON ACTIVATION

The activation of carbon is achieved by removal of the slightly volatile materials that remain in the many pores on the surface of the carbon after the initial carbonization. This is usually accomplished by one of four methods:

1. The action of inorganic materials, either added or found in the ash, during a final calcination.
2. Use of solvents.
3. Long continued calcination at very high temperatures.
4. Selective oxidation, usually by air, steam or carbon dioxide. This method may also increase the porosity of the carbon by oxidation of a small amount of the elemental carbon surface.

The selective oxidation process is the one most commonly used in the United States. Steam is usually employed, as it produces an endothermic reaction, thus easing the problem of controlling the temperature. The reaction with air is strongly exothermic and difficult to control. Carbon dioxide is not generally available at a sufficiently low cost.

The activation of a vegetable char by steam is carried out at a temperature of about 900° C. after the initial carbonization which takes place at 600-700° C. Somewhat similar conditions are employed in the production of activated carbon from bituminous coal. There, however, great care must be taken during the initial carbonization of the coal to see that no coking takes place. Also, if the carbon from coal is to be used for the treatment of liquids, an acid treatment is usually required for the removal of a major portion of the ash, which has a deleterious effect in carrying out certain adsorptions.

OTHER ADSORBENTS

While activated carbon is generally considered to be the most versatile of the commercial adsorbents, very large quantities of silica gel, activated alumina and various clays are also used. Their principal applications are in the drying of liquids and gases and the decolorization of various materials.

Silica gel is prepared from silicic acid formed by the controlled addition of a mineral acid to a silicate solution. A liquid hydrogel, miscible with water, is first formed. This is then mixed with more of the neutralizing acid and its salt, and the solid separates out. This solid becomes silica gel after dehydration.

One large-scale application of silica gel, activated alumina and activated bauxite is the drying of natural gas which is to enter a pipeline. The drying minimizes formation of solid hydrocarbon hydrates in the pipe line and helps prevent corrosion of the pipe itself.

Silica gel when impregnated with cobalt chloride exhibits a color change at about 30% relative humidity, providing a very simple and low cost humidity indicator. During the war large quantities of impregnated gel were sold to indicate the relative humidity existing inside cartons.

A major use for adsorbent clays and activated bauxite is in decolorizing vegetable and mineral oils. These inorganic adsorbents have two great advan-

tages in the treatment of low cost materials. They are, themselves, low cost materials, and they can be reactivated readily by use of air to burn off any high molecular weight carbonaceous material blinding the surface.

HYDROCARBON FRACTIONATION

Adsorbents are being used for the close fractionation of hydrocarbon mixtures in both the liquid and vapor phases. The latter has gone into large scale commercial use for the fractionation of ethylene, while the use of adsorbents for fractionation in the liquid phase is as yet confined to the laboratory.

LIQUID PHASE

It has been reported that the use of silica gel for industrial fractionation of hydrocarbons is being developed by several major petroleum companies. Whether this is a vapor or liquid phase operation is not known, but a possible clue is offered by a survey of the work which has been completed at the Bureau of Standards on the use of silica gel for the analysis of petroleum fractions.

The Bureau's procedure involves a type of chromatographic separation. The hydrocarbon fraction is allowed to percolate through a tube filled with silica gel, which adsorbs the hydrocarbon constituents in the following order: aromatics, cyclic olefins, straight chain olefins, and paraffins and naphthenes. Little separation is achieved between the paraffins and naphthenes.

After the adsorption has been completed, a desorbing liquid, usually ethyl alcohol, is allowed to pass through the tube, forcing the previously adsorbed hydrocarbons out ahead of it. Samples of the hydrocarbons are collected as they issue from the tube, and the refractive index is measured. A plot of the refractive index versus the volume collected produces a curve with a series of flats. The separations are quite sharp, and usually practically all of the volume will be represented by the flats, thus giving a measure of the volume of the various components present.

The curve is similar in pattern to the curves obtained in analytical distillations under high reflux, where boiling point is plotted against volume of distillate, the flats on the curve representing the volume of the component boiling at that point.

VAPOR PHASE

Activated carbon has been used for the rough fractionation of vapors for years. However, the Dow installation this spring is the first application using it for close fractionation with continuous operation.

The first use of activated carbon for separation in the vapor phase was for the removal of odors and stenches from air. This, however, was merely the removal of an undesirable material and not for the recovery of a valuable product. Probably the first use of the latter type was the recovery of light oil from coal gas. This began some time before the beginning of World War I in Germany. Since that time a number of these aromatic recovery units have been placed in operation in Europe, both on the continent and in Great Britain. It is reported that the operating costs differ only slightly from those of the oil-washing units which have become standard in the light oil recovery units in the United States.

Another application of a similar nature which was widely employed in the United States for some time was the removal of natural gasoline from natural gas by adsorption on carbon. This use was the outgrowth of work at the Bureau of Mines about 1918. At the present time no natural gasoline recovery units of this type are believed to be in operation here. Oil adsorption processes reign supreme for this use.

Solvent recovery units employing activated carbon are estimated to have a capacity for the recovery of over 1,000,000,000 pounds of solvents per year in North America alone. They are used for the recovery of normally liquid solvent materials introduced into the vapor phase by such varied industrial operations as the application of the finish to an automobile and the recovery of the carbon disulfide vapors developed in the spinning of rayon by the viscose process. Although these plants are fully automatic in their operation, they must be classified as batchwise, since the air containing the vapor is passed over the adsorbent until it becomes saturated, the flow stopped, and the vapor eluted from the adsorbent, usually with steam. The process used in light oil recovery and natural gasoline recovery is basically the same.

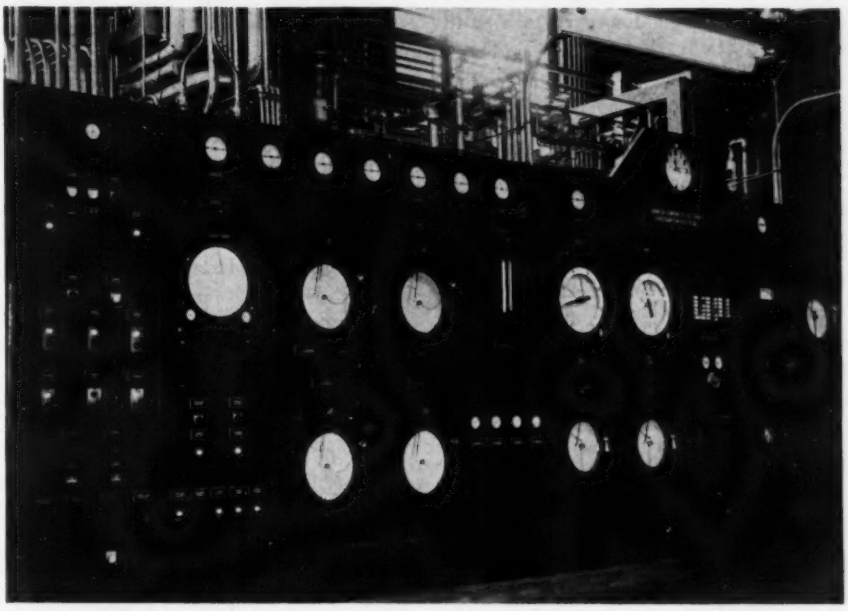
Some idea of the cost of operating the many existing batch type adsorption units can be obtained from data which have been published by Carbide and Carbon Chemicals Corp. concerning the operation of its "Columbia" solvent recovery units. Steam requirements range from three to five pounds per pound of solvent recovered. Electrical power consumption varies from 0.04 to 0.08 kw. hr. per pound of solvent recovered, while the cooling water requirements are approximately seven to twelve gallons per pound of solvent recovered.

Even for extremely large systems only one operator is required, and the maintenance cost rarely exceeds 5% of the initial investment in the plant. Cost of solvent recovery, including amortization of the plant, rarely exceeds one cent per pound and at times may go as low as 0.2 cents per pound.

RECTIFICATION APPEARS

Although, as indicated in the preceding paragraphs, activated carbon has been used in the United States for some time for fractionation, the fractionation achieved has been only of the crudest sort. The Germans can be credited with the first commercial use of rectification in conjunction with adsorption separations. This represented an advance in adsorption technology equivalent to that produced by placing a rectification section between the boiler and the condenser in a batch distillation.

The German operation was batchwise, and relatively close fractionation was obtained with fixed beds of carbon. The units were attached to all Fischer-Tropsch converters and served not only for the recovery of all lower-boiling hydrocarbons



Control panel of the Hypersorption pilot plant. The process is continuous.

Activated carbon is used for the recovery of streptomycin at Merck & Co.'s Elkton, W. Va., plant

formed but as a means of fractionation into the individual components. It should be noted that the Germans had a similar problem in the offgases issuing from a coal hydrogenation unit, but there the gases were not diluted and the reaction was carried on at an extremely high pressure, making it relatively easy to condense the highly volatile components and allowing the use of distillation for the separation. The offgases issuing from a Fischer-Tropsch converter, however, are diluted with quite large quantities of inerts and issue at essentially atmospheric pressure, thus pointing directly to the use of activated carbon. The carbon dioxide content of the Fischer-Tropsch gases also interfered with the use of either a liquefaction or by an oil absorption procedure.

In the operation of the units, the Fischer-Tropsch exit gases were fed to the bottom of the tower containing the carbon. The carbon was regarded as saturated and the cycle completed when the gasoline fraction was concentrated in the bottom of the tower and the lower-boiling materials, mostly C_3 and C_4, were in the upper part.

By suitable regulation of the elution operation, the Fischer-Tropsch gases were recovered in the following order: hydrogen, carbon monoxide and carbon dioxide, followed by the volatile hydrocarbons, C_3 and C_4, and finally the gasoline fraction. The initial adsorption was operated in such a manner that the percentage of inerts retained on the adsorbent was small.

This method of fractionation gives a separation somewhat akin to that obtained by a chromatographic separation of the various components of a solution. This latter procedure, however, although a most valuable laboratory tool, has as yet little commercial significance because of the large amount of labor connected with its operation.

TRUE CONTINUOUS PROCESSING

The next step in the development of adsorption separation technique might be described as analogous to making the batch distillation column to which a rectifying section has been added, capable of continuous operation. This is what has been done in the Hypersorption process. An adsorbent is used for the separation, but the system has a rectifying section and is capable of continuous operation.

The Hypersorption process is a development of the Union Oil Co. of California. In its operation a hyrodcarbon feed gas stream is contacted with a bed of activated carbon moving in the opposite direction. Coconut shell carbon has been found to be the most suitable for this purpose, not only because of its high adsorptive capacity but because it is much more resistant to abrasion than the other carbons. The first commercial scale Hypersorption plant is the one put in this spring by the Dow Chemical Co. at Midland, Mich., for the separation of ethylene from other hydrocarbons. It was designed and erected by the Foster-Wheeler Corp. Another commercial unit is under construction, but for the recovery of another hydrocarbon. Other separations now under investigation include the recovery and purification of acetylene, propylane and methane, and the separation of hydrogen from carbon monoxide and carbon dioxide from nitrogen.

The functioning of the process can best be described by following the movement of the carbon through a complete cycle. The principal part of the system consists of a tower through which the adsorbent carbon passes by gravity countercurrent to the feed of hydrocarbon vapor. There is a cooling section on top of the column through which the carbon passes first. Cooling enables the carbon to adsorb more vapor per unit of mass. The section below the cooler is an open tower and represents the rectifying section of the system.

The rectification effect is obtained as follows: As the carbon passes down the tower it tends to take up the heaviest constituents of the vapor first. Since the vapors at the top of the tower contain relatively little of the heavy constituents, more of the less heavy consituents are adsorbed at this stage. But as the carbon progresses further down the tower the concentration of heavy constituent in the up-coming gas increases, and the tendency is for this heavier material to displace the lighter material already adsorbed on the carbon. When this takes place throughout the length of the column an effect is achieved which is very similar to that obtained by reflux in distillation. The various constituents become concentrated at different points in the tower according to their weight.

The bottom part of the tower consists of a steaming section, which strips the adsorbed material from the carbon. After stripping, part of the carbon is conveyed to a hopper at the top of the tower to repeat the cycle, and part is bypassed to a higher temperature reactivation unit which operates in parallel with the main tower. This reactivation is carried out by high temperature steam stripping to remove any accumulation of heavy residual hydrocarbons which remain on the adsorbent after steaming in the tower. The reactivated carbon passes to the hopper above the column from which it is fed back into the system along with the recycle and make-up carbon.

A Hypersorption unit is capable of giving separate fractions. In the case of the commercial recovery of ethylene, four are obtained: (1) the lighter materials, mostly methane and inerts, which are discharged just below the cooler; (2) a side cut of ethylene; (3) a bottom cut of the heavier products, mostly C_3's and C_4's, which are discharged just above the steaming section; and (4) the hydrocarbons that are stripped from the carbon.

In the ethylene recovery unit now in operation, 76,900 cu.ft./hr. of mixed gases containing 5.7% ethylene are fed into the tower, and 7,000 to 7,500 lb./day of ethylene are recovered. Typical analyses of the charge and ethylene product are given below:

	Volume %	
	Feed	*Product*
Hydrogen	37.2	...
Oxygen	0.3	0.1
Nitrogen	6.0	0.1
Carbon monoxide	1.0	...
Methane	49.2	...
Acetylene	0.3	3.7
Ethylene	5.7	92.0
Ethane	0.1	1.0*
Carbon dioxide	0.2	3.1

* For this particular application it was not necessary to separate the ethane from the ethylene.

Little specific information is available on the investment cost of a Hypersorption unit. However, it has been reported that capital requirement is less by the cost of the refrigerating equipment than for a plant using the liquefaction distillation method and less by the cost of the compression equipment than the investment in an oil absorption process. The cost of the carbon is believed to be approximately 25% of the total investment. It has been reported that the steam consumption for a Hypersorption unit is much less than for an oil absorption unit because of the greater hydrocarbon retention by the activated carbon at ordinary pressures and consequent reduction of the amount of heat required to heat and cool the circulating medium.

ADSORPTION FROM LIQUIDS

The major use of carbon for adsorption from liquids is in solution purification. Here the adsorbent is usually contacted batchwise by mixing with the solution being treated. After contact it is removed from the solution by filtration. Adsorbents are used in this manner for the cleanup of cane, beet, and corn sugar solutions, and for the removal of taste and odors from water supplies, vegetable and animal fats and oils, alcoholic beverages, chemicals, and pharmaceuticals.

Another important use of carbon is to maintain the purity of cyclically used solutions in such operations as electroplating and dry cleaning. The general practice here is to precoat a filter with carbon and continuously or periodically circulate the solution through the filter for purification.

Carbon has, at one time or another, been used for the recovery of many materials by selective adsorption from a solution. One such case was the adsorption of iodine liberated from certain brines found in California, although this method has now been superseded by a process of chlorinating and blowing with air, similar to that used for recovery of bromine from sea water.

Carbon adsorption has also been used for the recovery of gold from the solution produced by cyaniding gold ore. In this case the carbon is not eluted but is burned off, leaving the gold behind.

A more recent development has been the use of activated carbon for the recovery of anti-biotics such as penicillin and streptomycin. It is no longer used for the recovery of penicillin, having been superseded by a process involving solvent extraction with ethylene dichloride in a Podbielniak centrifugal extractor.

The recovery of streptomycin probably represents the farthest advance in the continuous treatment of liquids with adsorbents. Carbon and broth are mixed together continuously, filtered and the adsorbed streptomycin eluted with audified alcohol, forming a solution of the streptomycin hydrochloride. This is neutralized and then concentrated under vacuum at a low temperature. The recovered carbon is recycled for further use.

In the next few years it seems likely that the greatest growth in the field of adsorption will be in the application of the Hypersorption process, either alone or in combination with present separation techniques. In any event, the design engineer has another separation method at his disposal. It is possible that in many separation problems the most economical solution will be a combination of hypersorption with distillation, absorption, or some one of the other separation tools.

PIPERONYL BUTOXIDE--SUPER SYNERGIST

BACK IN 1934 Dr. Oscar F. Hedenburg took on a heavy research assignment at the Mellon Institute. His objective: to synthesize chemicals containing only carbon, hydrogen, and oxygen in the hope of developing substances which would be potent insecticides yet non-toxic to man and animals. Over the years thousands of compounds were prepared, some of which held a little promise, many of which were of no apparent value.

Nevertheless, the work was continued, and recently Dr. Hedenburg and his associate, Dr. Herman Wachs, of Dodge & Olcott, Inc., outlined the merits of a group of insecticidally significant materials which they have developed.

Their products, piperonyl cyclonene and piperonyl butoxide, as well as other members of the same class, are non-irritating, relatively odorless and tasteless, amazingly non-toxic to warm-blooded animals even in massive dosage. Significantly, this lack of toxicity applies not only to oral administration but also to inhalation, skin absorption, etc.

One of the products now commercially available is known popularly as piperonyl butoxide (butyl-carbityl) (6-propyl piperonyl) ether, is marketed by Dodge & Olcott, Inc.

Noteworthy is the fact that although such compounds possess marked insecticidal value in themselves, their most unusual characteristic is the extraordinary synergism they display in combination with small proportions of pyrethrins. Their solubility in hydrocarbon oils and liquified gases is, of course, all to the good, permits the formulation of a rapid-acting spray with a minimum of pyrethrum content.

Pyrethrum is relatively costly. DDT is fairly toxic. There are numerous cases where sprays cannot be used because of health hazards. In such instances, particularly, the new synthetic synergists appear destined to play an important role.

DRYING AND NON-DRYING

A recently developed continuous distillation process, which also utilizes the solvent properties of furfural, is destined to enhance the commercial future of soybean oil. For, by means of such a process, the oil can be separated into two useful portions. One, a fast-drying oil of interest to paintmakers; the other, an improved raw material for food products.

Soybean oil is merely one type of vegetable oil which can be thus upgraded, but it is the one on which major interest is focused.

In essence, the process is dependent on the use of selective solvents with which the oils are not completely miscible at operating temperatures. Thus, when a glyceride oil and a selective solvent—such as furfural—are brought together at a temperature lower than that of complete miscibility two fractions are obtained. One consists predominantly of the solvent, the other is chiefly oil.

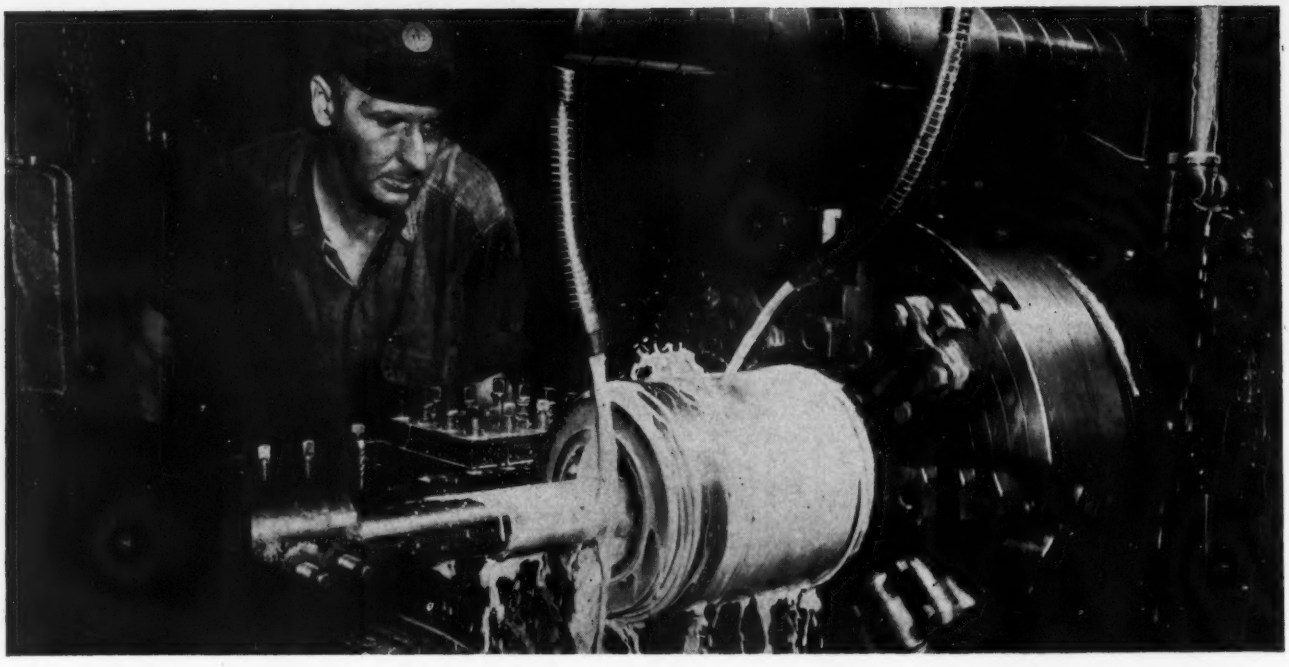
Continuous distillation is then employed to separate the two fractions.

PROCESS BRIEFS

● Fluorine holds promise of being a good commercial catalyst for stimulating the chlorination of organic compounds, according to research conducted by E. T. McBee and James A. Bittles, Purdue University. Investigations carried through on the vapor phase chlorination of ethane have proved to be particularly interesting. In these experiments fluorine and chlorine in a ratio of about 1:20 (weight basis) were used. The fluorine was recovered as hydrogen fluoride. Liquid phase reactions are also practical, whereby the compound to be chlorinated is dissolved in liquid chlorine, and a stream of fluorine is passed through the solution.

● Ion exchange in reverse is proposed as a method of extracting zirconium from its ores by John A. Ayres, Iowa State College. The process is based on treating non-acidified solutions of zirconium salts, which are colloidal in nature and do not contain zirconium ions. Thus, ion exchange resins will pick up impurities, concentrate the zirconium.

● Radioactive carbon atoms are now being used as tags to determine the activity of urethan, which it is hoped may provide a more effective treatment for leukemia and cancer. Studies are under way to ascertain if there is any abnormal concentration of urethan in the tissues of animals suffering from these diseases.



CUTTING FLUID Makers Profit From Chemical ADDITIVES' Use

by GEORGE G. PRITZKER,
Shell Development Co.,
San Francisco, Cal.

ALTHOUGH THE MANUFACTURE OF CUTTING FLUIDS is an important, growing business there has long been a dearth of information available on both ingredients and compounding. But a patent survey, coupled with definition of the essential properties of a satisfactory fluid, points up the opportunities presented for a wide variety of chemical additives.

FOUR decades or so ago the use of cutting fluids for metal working was minor. If fluids were employed to aid metal working operations they primarily comprised water or aqueous solutions containing a rust inhibitor. The chief function of such fluids was not to aid lubrication but to help cool the working tool and thereby increase its life. However, as it became more and more apparent that proper lubrication was essential, aqueous emulsions containing lubricating aids such as soaps, fats and the like were developed. Later oil base compositions were introduced.

The development of cutting fluid compositions was therefore rather haphazard since their importance and true function was not understood. With the advent of mass production, the real function of cutting fluids was studied intensively, and it was soon realized that they were much more than incidental adjuncts to metal-working operations.

Formulations had to be created to keep pace with the truly startling advances made in the machining of metals—scientifically compounded fluids which would permit faster, more economical and more accurate machining. Now, the manufacture of cutting fluids is an industry of some stature which is constantly evaluating a myriad of chemical additives.

There are on the market today as many different kinds of cutting fluids as there are theories as to just what happens during a cutting operation. But the main types can be placed in a few categories, and the fundamental properties they must possess can likewise be rather simply stated.

The two primary factors which are encountered in a cutting operation are high friction and high temperatures. A cutting fluid can decrease friction by acting as an effective lubricant. To decrease the temperature a cutting fluid should act as an effective coolant. It would be preferable if the cutting fluid could reduce the friction by effective lubrication; for it is really due to frictional forces that the temperature of the work piece increases. Furthermore such a cutting fluid would reduce the power required for cutting, increase tool life and improve the surface finish of the work piece. However, since under general conditions of cutting efficient lubrication is more difficult to achieve than efficient cooling, the cooling function of a cutting fluid takes on greater importance.

An ideal cutting fluid, of course, would be one which could effectively cool and lubricate with equal efficiency. Such a fluid would reduce power consumption, prevent distortion of the work, improve accuracy and finish, help to remove chips and abrasives from the surface being worked.

Through the years, cutting fluids have seen many changes. Early investigators found that when a stream of water was allowed to cover the tool and work piece an increase of from 15 to 40% in cutting speed was obtained. But water caused

heavy rusting and therefore was highly disadvantageous to use. However, it was soon discovered that the addition of an alkali (such as soda) inhibited rusting and also improved the cutting performance of the fluid. Nevertheless, both water and the soda solution functioned only as coolant, did not have any lubricating properties.

The next important phase in the development of cutting fluids was the discovery that fixed fatty oils such as lard, rapeseed oil, sperm oil and the like, acted as good lubricating agents for various cutting operations. Lard oil was for years the most popular cutting fluid, particularly where heavy-duty cutting of steel was involved, and is even used today for some operations. The reason for its popularity is its unique oiliness property. Lard oil as well as a good many other types of fixed or fatty oils have greater oiliness than mineral oils. Just what oiliness is and why fixed oils have greater oiliness is not fully understood. Herschel[3] defines oiliness as "the property that causes a difference in the friction when two lubricants of the same viscosity at the temperature of the film are used under identical conditions".

FATTY OIL SHORTCOMINGS

Fatty oils have, however, a serious drawback in that they are susceptible to oxidation and thus form gummy deposits which cause sticking of movable parts of the machine. Also they tend to become rancid, resulting in foul odors, and they pose dermatitis problems.

The substitution of hydrocarbon oils for fixed fatty oils has been the goal for many years primarily because of their stability, wider viscosity range, greater availability and lower cost. When machining metals of high tensile strength mineral oils, however, are not satisfactory because of their inability to reduce friction—apparently due to lack of oiliness. To overcome this defect desired amounts of fatty oils, fatty acids and other types of oiliness agents were blended with mineral oils.

The fluidity and penetrating properties of mineral oils, combined with the oiliness and lubricating properties of fatty oils, resulted in cutting fluids which enjoy popularity even to this day. To increase the lubricity and film strength of such fluids, sulfur and/or halogenated compounds were introduced. Today the majority of cutting fluids, whether in emulsion form or as straight blends of oil mixtures, contain sulfur, phosphorus or chlorine in some form.

In cases where cooling appears to be preferable to lubricating either water or some aqueous emulsion fortified with an oiliness and/or extreme pressure agent is used.

Soluble oil emulsions possess great cooling power, so that the heat generated in cutting is rapidly eliminated and the metal may be removed more quickly than is possible with straight oils. With soluble oil emulsions objectional fumes are not encountered and the danger of workers becoming affected by oil dermatitis is diminished.

There are on the market today many different kinds of cutting fluids but, as stated previously, they may be divided into two broad groups, namely, the soluble oils and straight oils. A rather complete summary (particularly on sulfur bases) of the patent literature on cutting fluids through the year 1935 is covered in Klemgards[5]. Since that time numerous other cutting fluids have been patented.

EMULSION TYPE

Considering the soluble oils first, Birkby[6] produced a soluble cutting oil by taking hydrocarbon distillates (particularly naphthenic hydrocarbons free from wax) and hydrogenated them in the presence of a catalyst at a temperature of above about 750°F. and a pressure of about 3500 pounds per square inch. The product of such a destructive hydrogenation process is emulsified with ethanolamines, ethylene glycols, and their soaps, as well as petroleum sulfonates and the like. Other petroleum oils, fatty oils, oil waxes, vegetable oils (blown or otherwise) may be included. These soluble oils inhibit rusting and oxidation. A typical base which may be emulsified with two parts of water comprises:

Triethanolamine oleate	2.5%
Oil soluble sulfonate	7.5%
Mineral Oil reformed by destructive catalytic hydrogenation	90.0%

Miller[7] in a discussion on soluble cutting fluids discloses the following compositions:

Lubricating Oil	150 parts
Oleine	85 parts
Caustic Soda	6 parts
Water	250 parts

A useful oil was prepared by mixing 1 part of rosin oil with 10 parts of lubricating oil and adding 20 per cent caustic soda solution until a clear oil which emulsifies with water was obtained.

Another formula reads:

Lubricating Oil	250 parts
Rosin	22 parts
Oleine	22 parts
Caustic Soda	3 parts
Water	10 parts

Still another formulation comprises:

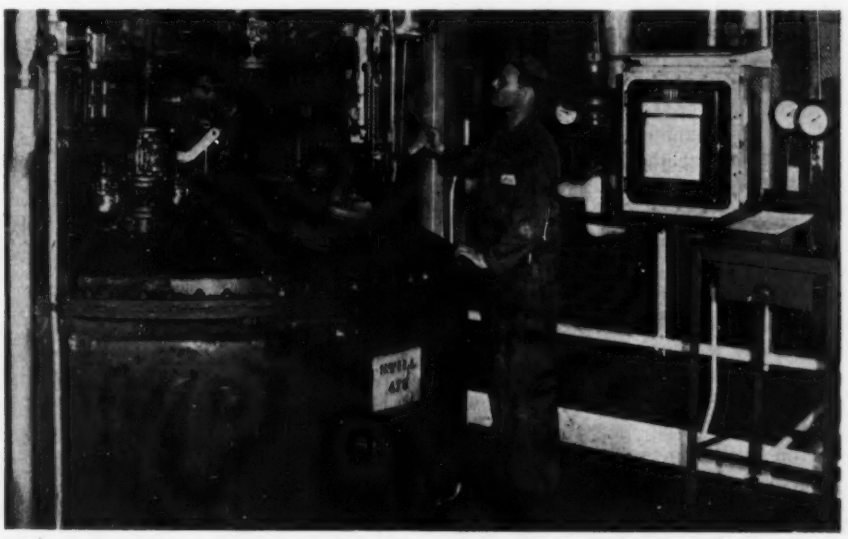
Sulfonated soya-bean oil	13½ parts
Sulfonated castor oil	25 parts
Lubricating Oil	17 parts
Water	32 parts

and sufficient caustic soda solution to give an oil bright appearance. Soluble oils were also prepared by admixing sulfonated castor oil, lubricating oil and cresols. Too, when a mixture of naphthenic acids, mineral oil, rosin and caustic soda were emulsified with water a milky-white cutting fluid was obtained.

EXTREME PRESSURE ADDITIVES

In a discussion on soluble oils Thornley[8] states that in cases where extreme pressures are encountered it is more advantageous to use a very viscous mineral oil-base, rather than light mineral oils, which are usually used. Also Higinbotham[9] discloses that the addition of colloidal graphite to soluble oils increases cutting speed and tool life.

Werntz[10] discloses that by adding to water a minor amount of an aliphatic acid ester of a dibasic organic acid, in which the aliphatic radical contains at least 6 carbon atoms or amine salts thereof, a good cutting fluid may be obtained. Particularly effective for this purpose are acid esters of citric, maleic, succinic, and phthalic acids. Representative compounds are: octyl acid phthalate; cetyl acid phthalate; cetyl acid citrate; 9-10-octadecnyl acid citrate; dodecyl acid succinate; dodecyl acid maleate; dodecyl acid phthalate; "Lorol" acid maleate; octyl acid phthalate; acid phthalate of the alcohols from petroleum, "Lorol" acid phthalate and naphthenyl acid phthalate.



Closely controlled reaction conditions are essential for cutting fluid formulation.

Cutting fluids suitable for high speed operations on tough alloy steels were prepared by Zimmer[11] by admixing 50 to 90% of a mineral oil, 1 to 20% of a sulfurized oil such as lard oil or other animal, vegetable or marine oils as well as their fatty acids, and a minor amount of an emulsifying agent such as mahogany soaps, naphthenic acid soaps, and fatty acid soaps. To help disperse the sulfurized oil in water a polyhydric alcohol is used and to stabilize the emulsion a small amount of a strong alkali such as sodium or potassium hydroxide, soda ash or carbonates is recommended. One volume of the base is diluted with 16 volumes of water and for use as a cutting fluid.

A free flowing, non-congealing, cutting emulsion is prepared by Waugh[12] by saponifying a palm oil admixed with a mineral oil base at a temperature of between about 70° to 140°F. and thereafter forming an emulsion by adding warm water. The saponifying agent may be triethanolomine or an inorganic base such as sodium or potassium hydroxide. This composition is non-corrosive and is stable on dilution with even 20 parts of water.

SULPHURIZING AND PHOSPHORIZING

A cutting, grinding and polishing soluble oil, particularly suitable on aluminum was prepared by Anderson[13] by sulfurizing and then phosphorizing a vegetable, animal or marine fat or oil, admixing it with mineral oil and an emulsifier and adding water. Sulfurization may be accomplished by admixing prime lard oil with a lubricating oil and reacting the mixture with sulfur chloride and sulfur at about 270°F-330°F. This reaction product is then cooled to about 150°F. and treated with phosphorus sesquisulfide at 220°-230°F. The emulsifiers may be sodium naphthenate, sodium sulfo naphthenate, Twitchell reagent and/or their mixtures. Small amounts of homogenizing agents may be added such as diethylene glycol, glycerine, butyl and amyl alcohol. A representative base listed below may be diluted with as much as 40 parts of water.

Twitchell reagent	25%
Sulfurized-phosphorized base	10%
Lubricating Oil	65%

Dombrow[14] prepared a soluble cutting oil base by admixing a water-insoluble soap of a naphthenic or unsaturated higher fatty acid, an emulsifier such as a mixture of mahogany soap and a sulfonated fatty material and mineral oil. This composition may be emulsified in hot water. The function of the water-insoluble metallic soaps is to inhibit corrosion. The emulsifiers other than mahogany soap may comprise sulfonated sperm, olive, cottonseed, neatsfoot, lard, cod fish oils, etc. Another soluble oil was prepared by Nelson[15] using as the emulsifying agents equal parts of alkali resinate and naphthenate which have been only partly saponified. A mutual solvent such as diethylene glycol monobutyl ether with a sulfonated castor oil added to improve the surface finish, increases tool life and makes the soluble oil resist the action of hard water.

Although direct reference to a cutting operation is not made in the Singer[16] patent, the composition disclosed therein would undoubtedly be suitable for this purpose. The compositions are particularly suitable for cold working of metals such as drawing. They comprise an aqueous solution containing salts obtained by combining higher molecular fatty acids with sulfonates and adding thereto an alkali metal carbonate or borate to inhibit corrosion. If desired rapeseed oil or rape oil may be added to the mixture.

NON-RUSTING EMULSION

An emulsified coolant for high speed operations was prepared by Elsmere[17] containing as the active ingredient an alkylolamine ester of a higher fatty acid and a dispersing agent. Sulfonated animal, vegetable or marine oils such as sulfonated castor oil; pine oil or alkali soaps such as sodium or potassium stearate were used as dispersing agents. A non-rusting soluble cutting oil which prevents dermatitis was prepared by Adams[18] by adding to chlorinated sulfonates a soluble oil. These chlorinated sulfonates may be prepared by treating a mahogany soap and some free caustic with chlorine at 130-150°F., and neutralizing the reaction product with caustic. A preferred formula of such a composition has the following range of composition:

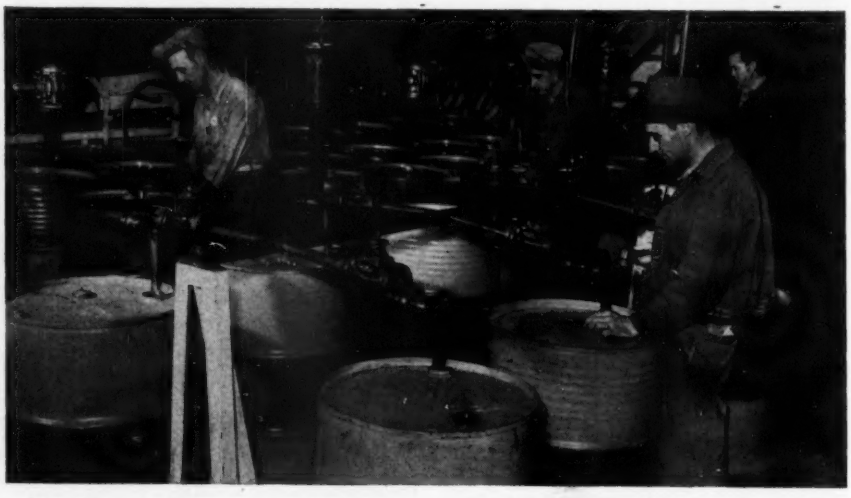
Oil	79.5-89%
Chlorinated Mahogany soap	5-18%
Soda rosin soap	0-3.5%
Alcohol, not more than	1.5%
Water, about	1.0%

A bacteriostatic, and extreme pressure cutting emulsion having excellent oiliness properties, was prepared by Segessemann[19] using as the active ingredient a sulfurized unsaturated aliphatic alcohol such as oleyl, linoleyl, ricinoleyl, hexadecenyl, undecylenic, erucyl alcohols or alcohols obtained by reducing unsaturated fatty acid esters, or those obtained from sperm oil or Dogling's oil wherein the unsaturated alcohols are obtained by saponification and subsequent extraction or distillation thereof. To render the lubricant emulsifiable mahogany soap or fatty acid soap or sulfonated sperm oil may be used.

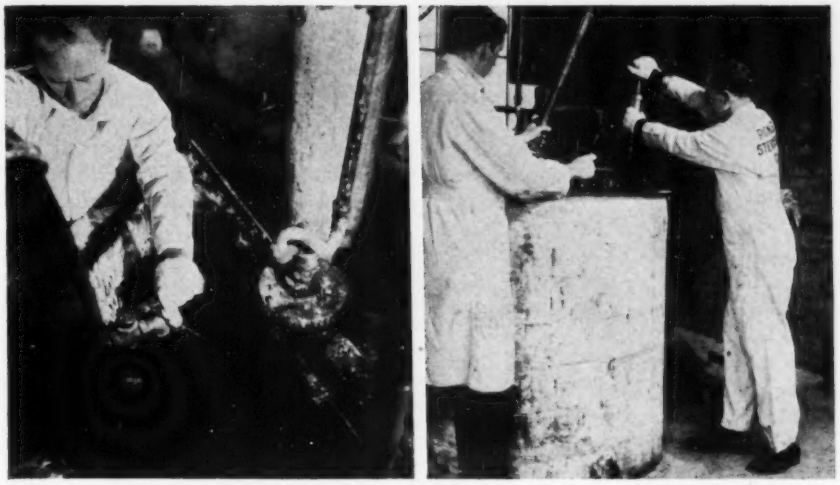
FOAM DEPRESSANTS

To inhibit foaming of cutting emulsions it has been discovered that various plumbites, aluminates and stannates[20] can be used. Substances of this character are sodium and potassium aluminates, plumbites, sodium stannate as well as corresponding zinc salts. Another method of inhibiting foaming of a soluble oil, disclosed by Carlson, involves phenolic additives such as xylenols, cresols, cresylic acid. Downing[21] discloses that addition of an organic ester of a phosphorus acid to either water, oil, or a dipersion of oil in water, reduces the friction between the cutting tool and the work and provides effective means for cooling the work. Esters which may be included are: dilauryl phosphate, dicetyl, dicyclohexyl, dioleyl, trinaphthyl, dilorolphosphates; diethyl phosphate, tri-ethyl phosphate, triocenol phoshpate, lauroxy-ethanol phosphate, di-phenyl phosphate, di-cresyl phosphate, tri-nitrophenyl phosphate; amine salts of the above esters, etc. Effective aqueous solutions for cutting operations may be obtained by addition of sulfonamides[22]. The sulfonamides may be dispersed in water by means of Turkey red oil, water-soluble alkali metal and amine salts of aliphatic acids, e.g., sodium oleate, sodium stearate; amine and alkali metal salts of higher aliphatic alcohol sulfates, mineral oil sulfonic acids, sulfonated oils, casein, glue, starch, pectin, gum arabic and polyvinyl alcohols.

To improve the load-carrying capacity of Waugh's soluble oil[12] it has been found advantageous to incorporate phosphorus containing compounds[23]. These additives



Although most shipments are made in drums, cutting fluids constitute big business. Two main types are marketed: petroleum-based and water emulsifiable concentrates.



Courtesy Bee Chemcial Co.

Raw materials, such as animal or mineral oils, are blended, processed, and additive-treated.

may be obtained by reacting phosphorus compounds with compounds containing hydroxy groups.

GRINDING COOLANTS

A soluble oil which is not affected by soft or hard water and resists foaming may be obtained by mixing a petroleum oil, mahogany sulfonates, an alkali metal soap and an alkylolamine[25]. Such a composition is most effective in grinding processes:

Mahogany Soap	15%
Sodium Resinate	2.65%
Triethanolamine	1.0%
Water	2.0%
Petroleum Oil	Balance

The combination of an ethanolamine soap and a glcerine mono-ester is disclosed by Hodson[26] as a cutting base for using with water or oil emulsions. The glyecrine mono-esters of oleic, stearic, cocoanut oil fatty acids, cottonseed oil fatty acids, soybean oil fatty acids, linseed oil fatty acids or the like may be used. Johnson[27] discloses a method of making a soluble cutting oil by (1) liquid phase oxidation of a specific petroleum fraction, (2) saponifying the oxidation product, (3) deoiling the saponified product, (4) fractional acidification of the deoiled saponified material, (5) water washing the acidic fraction, (6) saponification of the washed acidic fraction, and compounding of this product with a suitable sulfonate, mutual solvent and water. Sulfonates of a different type but which are particularly suitable in cutting fluids are disclosed in U. S. patent 2,315,375[28] having the following general formula

$$Y - OSO_2 - R - \begin{matrix} COOX \\ COOX \\ COOX \end{matrix}$$

Another patent[29] describes a soluble oil comprising:

Water	7.5%
Glyceryl Mono-oleate	35%
Potassium Rosin Soap	45%
Red Oil Soap	5%

A reaction product obtained by reacting tetrafluoroethylene and a non-polymerizable organic compound such as dioxane, ethyl propionate, n-butyric acid, cyclohexanol and the like is cited in a recent patent[30] as a suitable cutting oil additive. A specific type of sulfonate is disclosed in a British patent[31] as a desirable additive in cutting oil emulsions. The sulponate is obtained by the solvent extraction of a naphthenic type petroleum oil, sulfonating the extract and neutralizing the sulfonated extract with an alkali. This sulfonate may be combined with an alkali metal salt of stearic acid, a corrosion inhibitor such as cyclohexylamine and a complex agent such as a polyhydric alcohol or tall oil. In a Russian publication[32] a cutting oil emulsion having the following representative formula is disclosed:

Mineral oil	75-80%
Na salt of sulfonated Shale oil	5-10%
Caustic Soda	0.2%
Water	14.8%

Berl[33] in forming a soluble oil utilizes a water-soluble sulfonic acid tar or its salts, and, to improve its wetting power, a minor amount of di- or tri-sodium phosphate is added.

An emulsion for cutting of soft metals was prepared by Harrel[34] by admixing a "Lorol" residue (which is a distillation residue of a hydrogenated fatty oil) and an emulsifying agent such as a water-soluble non-acidic salt of an acid-ester of phosphoric acid. The "Lorol" residue is obtained by the carboxyl hydrogenation of a natural fatty oil in the presence of a hydrogenation catalyst until the major proportion, at least 70%, of the carboxyl groups have been reduced, followed by separation of the hydrogenation catalyst and distillation of the reaction mixture to remove substantially all alcohols up through octadecyl alcohol. In another patent[35] Harrel discloses that the foregoing emulsions have a tendency to foam but that this may be inhibited by adding pine oil, camphor oil, a tetrahydronaphthalene or cyclohexanol.

The use of straight oils for metal cutting is very old and well known in the art. As early as 1868, Northcott[36] observed that the use of an oil makes a great difference in the power required to drive a lathe against a certain cut, and that the work was much smoother, the tool cooler and greater operating speeds were possible without injury to the tools. For years fixed fatty oils such as lard oil, sperm oil, rapeseed oil and the like were used for heavy duty cutting due to their high oiliness. This oiliness property, as mentioned previously, in fatty oils is much higher than in mineral oils. Thomsen[37] states that oiliness is greatest for fatty acids, smaller for fatty oils, and smallest for mineral oils, although varying within wide limits inside each group. It is because of this property that fatty oils were preferred to mineral oil in metal working.

However, Southcombe-Wells[38] discovered that the addition of a minor amount of a fatty acid such as oleic acid to a mineral oil improves oiliness properties of mineral oil equal to or better than a fatty oil. With this discovery compounded mineral oils became preferable as cutting fluids due to their greater stability and lower cost. The next forward step was the realization that a certain type of compounds such as sulfur, chlorine and/or phosphorus containing materials greatly improve the extreme pressure properties of an oil, make it particularly suitable for metal working. This discovery can be traced to as early as 1888, when Sommer[39] in obtaining a patent disclosed that certain sulfochlorinated compounds are particularly suitable for use in cutting lubricants. It was not until 1918, however, that the use of sulfur containing materials[40] in cutting lubricants became popular. Since that time and up through 1935 the sulfur base cutting oil art is rather adequately covered by Klemgard[5] and the reader is therefore referred to this text.

TERPENE DERIVATIVE

In 1936, Kaufman[41] obtained a patent on a cutting oil for use under high pressures. The process comprises sulfurizing a terpene type compound with sulfur under super-atmospheric pressure and at a temperature of at least 300° F. This sulfurized base is miscible with mineral oil, free from sludge and exhibits extreme pressure characteristics. A later patent obtained by Kaufman[42] involves using only the residuum fraction of a sulfurized pine oil, rather than the entire pine oil fraction as a cutting oil base.

The function of sulfur and certain sulfur compounds as anti-welding agents is readily appreciated. Oils containing active sulfur will give much higher values on either the S.A.E., Almen or Falex machines than will oils containing active chlorinated compounds. However, "wear" is greatly increased when using sulfurized

oils in preference to sulfur-free oils. This finding has been noted by both Lawson[43] and Oldacre[44] and many others.

SULPHUR AND CHLORINE

To obtain a cutting oil having a large amount of sulfur in loose chemical combination and which is free from obnoxious odors, Wilkey[45] resorted to the following sulfurization process. To a mineral oil or a combination of mineral, animal and vegetable oils, sulfur was added and the mixture heated until the sulfur melted in the oil. Dry chlorine gas was then passed through the mixture, allowed to cool and finally reheated to stabilize the product. The excess chlorine was removed by passing air through the mixture. Lincoln[46] discloses that a good color, odorless cutting fluid of high stability may be obtained by adding to a mineral oil from 1 to 10% of a dialkyl polysulfide. Free sulfur can be added with advantage particularly since dialkyl polysulfides are solvents for sulfur.

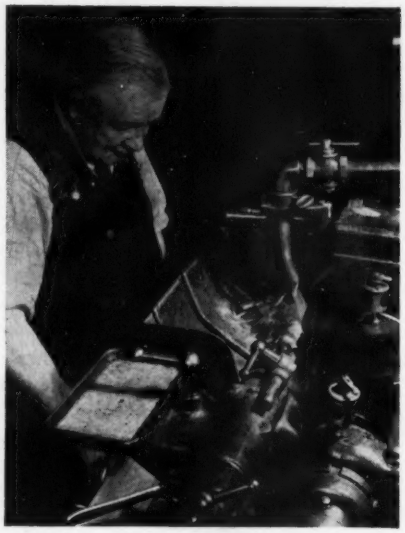
Dahlberg[47] prepared a cutting oil base by mixing oleic acid, pine oil and mineral oil and adding thereto aqua ammonia. This base can be used with straight oils such as mineral, plant, fish or animal origin, such as lard oil, mineral oil, kerosene or their sulfur derivatives. Guthman[48] also discovered that ammonium soaps of higher organic acids possess very useful properties for improving the cutting and cooling action of straight cutting oils. Further improvement can be obtained by addition of oleic acid, castor oil fatty acid, pine oil, hexalin and other blending agents to compositions of this invention.

Pevere[47] discloses that by adding to a lubricating oil, 1-10% of an organic polysulfide such as ethyl-tolyl or phenyl-tolyl polysulfide, an excellent cutting oil can be obtained. Sulfur may also be incorporated in the oil without heat, since the sulfide acts as a solvent without changing the characteristics of the oil. Another solvent for sulfur is disclosed in the Steiner[48] patent. Steiner utilizes as solubilizers for sulfur various derivatives of naphthalene such as chloronaphthalene, decalin, alkylated naphthalene, coal tar oil cuts boiling between 400° and 600° F., tetralin and the like. The addition of 1 and 2% of oleic acid improves the product. Although naphthalene derivatives are good sulfur solvents, they are not very soluble in mineral oil. However, Steiner[49] in another patent, discloses that this can be remedied by using a highly halogenated naphthalene.

Hull[50] claims that a good cutting oil may be obtained by adding 0.5 to 20% of an iso-olefin polymer which has been successively treated with sulfur and a halogen, such as chlorine. Examples of iso-olefin polymers are iso-amylene, iso-butylene polymers and the like, as well as co-polymers of these iso-olefins with normal olefins.

The patent art also reveals that sulfonyl fluorides[51] are good cutting oil additives. The additive is obtained by reacting an alkyl halide with thiourea in a high boiling solvent to yield an alkane sulfonyl chloride which on being treated with an aqueous potassium fluoride yields the desired additive.

A stable cutting oil was obtained by Raymond[52] by mixing a lubricating oil with a metal naphthenate and naphthenic acid. The metallic naphthenate may be Mg, Ca or Al naphthenate. A cutting oil base was prepared by Hughes[53] by reacting phosphorus pentasulfide with mineral oil at a temperature of 200-450° F. for 1 to 10 hours. To improve the product cottonseed oil, corn oil, degras, lard



Emulsifiable types, particularly, are used as abrasive wheel coolants. They should have a minimum odor and be bacteriostatic.

oil, sperm oil, tallow, castor oil, cod liver oil, linseed oil, menhaden oil, perilla oil, soybean oil, etc., can be added. Detergents such as ketones, alcohols, alcoholates, salts of organic acids, higher fatty acids, naphthenic acids, sulfonic acids, or compounds such as dioctyl ester of sodium sulfo-succinic acid may also be utilized in these cutting oils.

Gabriel[54] prepared a cutting oil, by mixing a sulfur base oil with carbon tetrachloride and allowing the mixture to stand at about room temperature for at least two weeks.

To obtain a high speed cutting oil Hunter[55] admixed a light non-viscous mineral oil and a viscous mineral oil having a Saybolt Universal viscosity of at least about 100 at 210° F. and adding thereto an anti-oxidant. Fatty oils such as tallow oil, neat's foot oil, sperm oil, wool oil, whale oil, olive oil, rapeseed oil, corn oil, castor oil can be added. Anti-oxidants such as tri-(tertiary-amylphenyl) phosphite, tri-butyl phosphite; extreme pressure agents such as sulfurized fatty or mineral oils; wetting agents such as fatty acids and detergent sulfonate can be incorporated with the base of this invention.

The problem of dermatitis generally arises with most cutting fluids owing to their susceptibility toward oxidation and rancidity. In most cases the common practice of adding germicidal agents to cutting fluids — such as phenolic and chlorinated compounds as well as formaldehyde—has proved of little benefit. Other methods such as heating cutting fluids to elevated temperatures is time-consuming, expensive, requires extra equipment, and also is of minor value. Urging the machine operators to observe clean habits and to wash with sulfonated castor oil soaps is difficult to enforce. Cutting fluids which are substantially bacteriostatic, therefore, hold a substantial sales edge.

As the foregoing survey indicates, there are scores of cutting fluids on the market and the common claim for each is that it will perform ideally under the most adverse conditions. That there is room for improvement in the formulation of fluids there is no doubt, but the fact that cutting fluid compounding is evolving from the status of a crude art to a science is in itself portentous.

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THE CHEMICAL PANORAMA

NEWS OF THE CHEMICAL PROCESS INDUSTRIES IN PICTURES

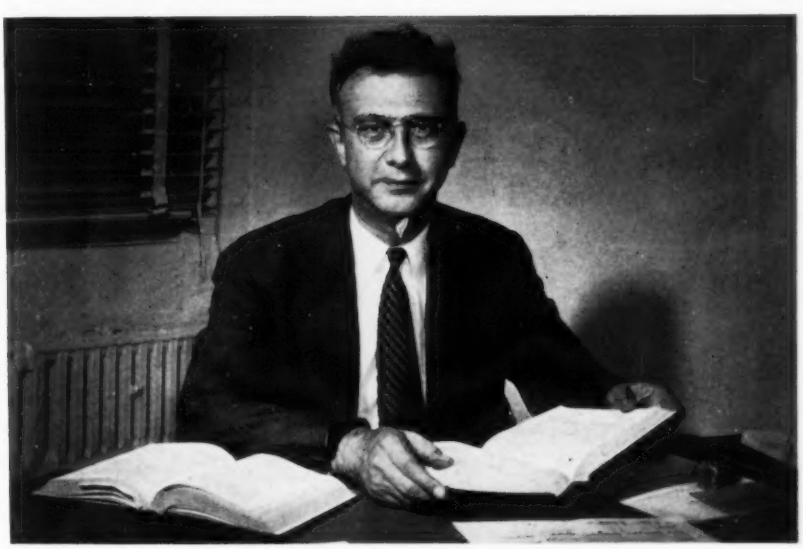
PEOPLE

Oliver E. Goddard, named vice-president of Fisher Chemical Co., Inc. He was previously sales analyst for Naugatuck Chemical Division, U. S. Rubber Company.

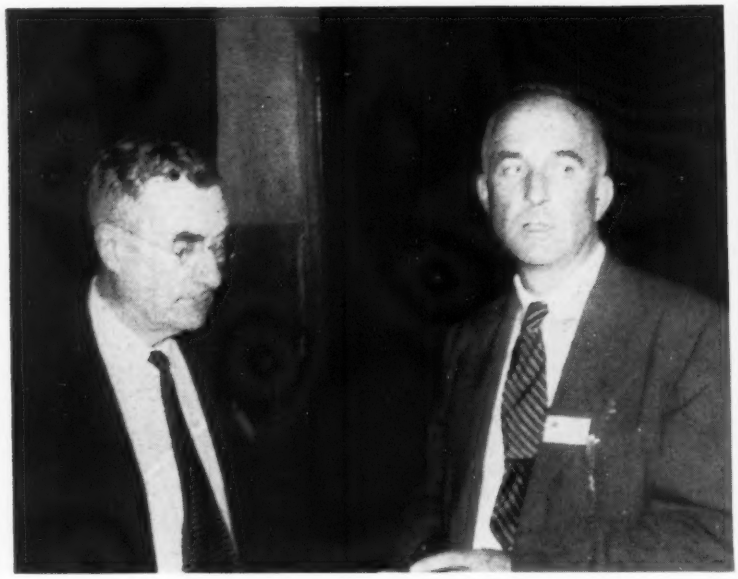
A. H. Marden, who has been made vice-president of the Dominion Tar and Chemical Company, Ltd. The company is the major Canadian producer of tar-derived chemicals.

Ralph N. Lulek, chosen manager Ammonia Div., Heyden Chemical Corp. He also heads the Antibiotic Div.

Paul J. Brodeur, appointed manager of the chemical department, United States Foreign Corp.



Cyril J. Staud, new director of the Kodak Research Laboratory, Eastman Kodak Co. He joined Kodak in 1924, and has worked on cellulose derivatives in the organic chemistry dept.



Warren K. Lewis, Massachusetts Institute of Technology, receives Priestley Medal from President of the Society, W. A. Noyes, Jr.

Louis Schmerling, Universal Oil Products Co., recipient of the first Ipatieff Prize, with Dr. Ipatieff, donor.

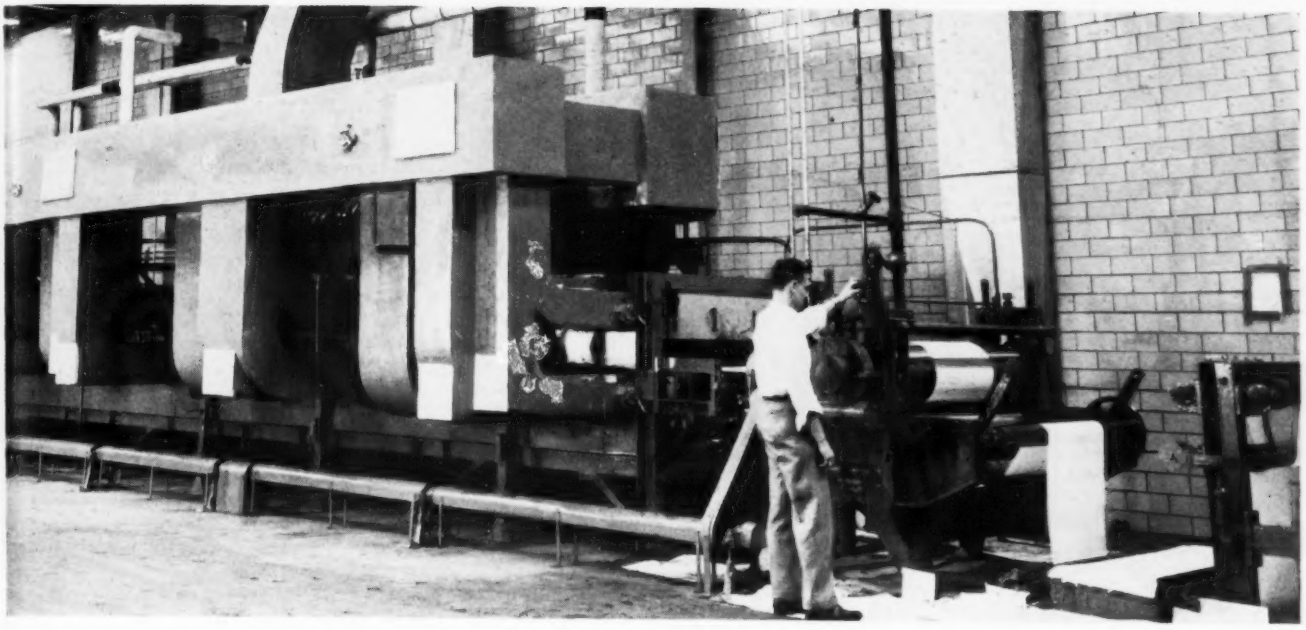
Medalists Honored

On Monday evening, September 15, registrants at the 112th Meeting of the American Chemical Society crowded into Manhattan Center for the general meeting. Recipients of various awards were honored during the course of activities, and addresses were given by President Noyes and two of the medalists. Noyes' Presidential Address was "The Mechanism of Photochemical Reactions." Dr. Glenn T. Seaborg, University of California, described "Nuclear Transformations in the New High Energy Ranges"; and Dr. Warren K. Lewis, Massachusetts Institute of Technology, spoke on "The Kinetics of Reaction of Steam and Carbon Dioxide with Carbon."

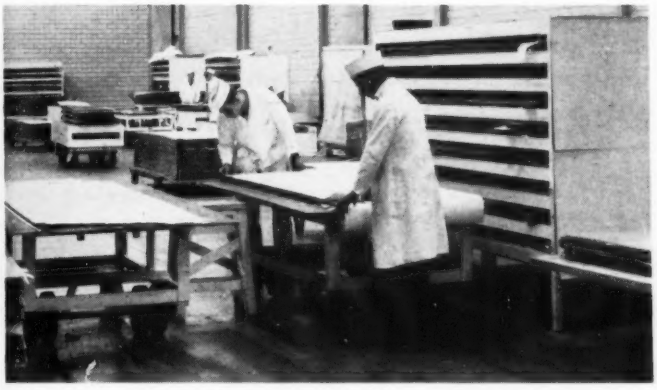
Van R. Potter, University of Wisconsin Medical School, receives the Paul-Lewis Laboratories Award in Enzyme Chemistry from Paul Halmbacher.

Mary Laura Sherrill, head of the chemistry department of Mount Holyoke College, winner of the Francis P. Garvan Medal for Women chemists.

Foster D. Snell chats with Dr. Seaborg, winner of the A. C. S. Award in Pure Chemistry, a $1,000 prize sponsored by Alpha Chi Sigma.



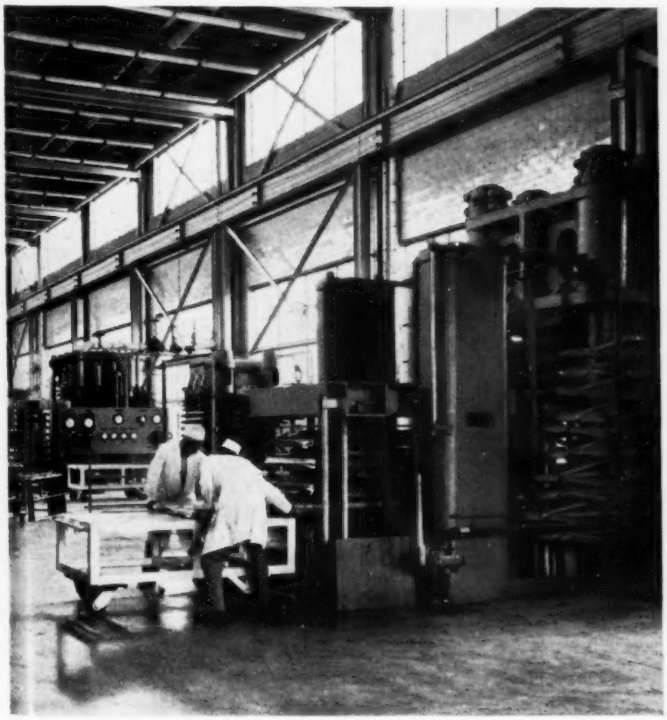
Ventilating ducts almost obscure from view the machine in which paper is coated with varnish and dried. Exhaust ducts remove noxious vapors, while huge quantities of conditioned air are admitted through ceiling outlets. Glazed tile walls facilitate maintenance of cleanliness.



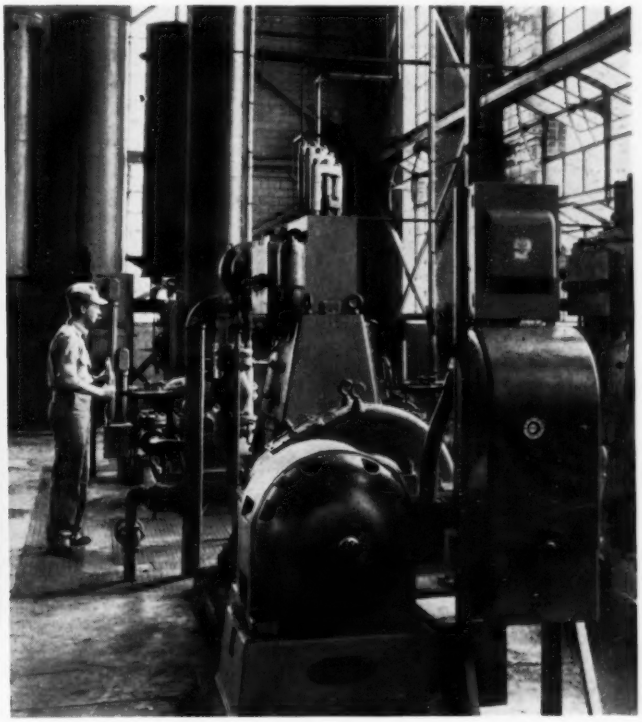
Inspection and assembly of laminated plastic products is made easier by uniform fluorescent lighting. Filters remove all dust from the air.

G. E.'s New Plastics Plant

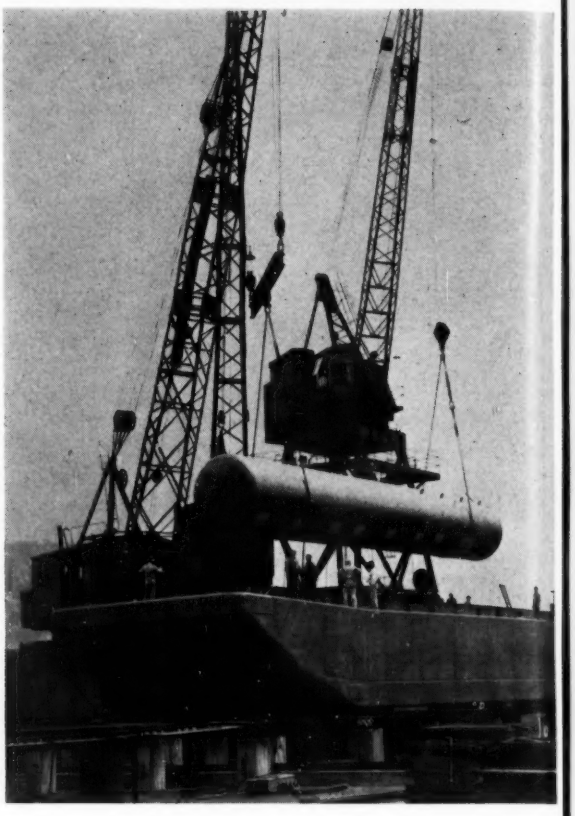
Products ranging from gears and bearings to refrigerator door panels are manufactured in General Electric Company's new plant at Coshocton, Ohio. In it engineers of the Austin Co., which handled design and construction, have combined many new types of building material and equipment to provide maximum efficency and comfort and minimum cost of upkeep. Features of construction are clear glazed tile from floor to ceiling. Specially insulated walls (2" of foam glass, 4" of hollow tile), and dust-free, conditioned air, whose temperature and humidity are accurately controlled.



Scores of hydraulic presses, ranging up to 5000 lbs. capacity, are located in this craneway bay extending the whole length of the plant.



The two hydraulic pumps in the foreground and the tall cumulator tank behind are used to maintain 3000 lbs. pressure for all the presses.

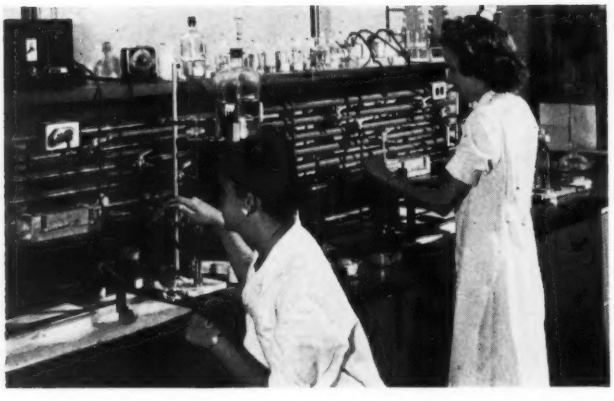


Chlorine Barge

Above is one of the eight new chlorine barges built by Dravo Corporation for Columbia Chemicals Division, Pittsburgh Plate Glass Co., and the affiliated Southern Alkali Corp. Said to be the first barges specifically designed and built for the purpose, these units will deliver chlorine more economically to users along the inland waterways. At the right cranes are lowering one of the four 150-ton tanks into the barge. Positioning of these large pieces of equipment required extreme care in order to avoid undue stresses and strains. They were made by Blaw Knox Co. and A. O. Smith Corp. Four of the eight barges have already been launched; the others are awaiting delivery of the tanks.

Celanese Laboratory

Last month Celanese Corporation of America formally opened its new central research laboratory at Summit, New Jersey. "As research expanded," said George Schneider, vice-president and technical director, in tracing the company's growth, "it became evident that some degree of centralization was necessary, especially for the more basic problems of chemistry and physics. For this purpose the Summit property was acquired . . ." On the occasion of the opening Celanese also announced the establishment of its annual Professional Progress Award in Chemical Engineering, to be administered by the A. I. Ch. E. At the left is a portion of the chemical laboratory; below, left, is the micro-analytical laboratory. Directly below is a technician testing the elasticity of fabric samples in one of the 140 rooms of the research building.



NOT QUITE THE PRESSURE COOKER a housewife is used to! This one is a modern heat-processing kettle, vital aid to many industries. It's typical of the hundreds of highly efficient systems heated with Dowtherm, the high-temperature, low-pressure heat transfer medium.

One reason for Dowtherm's popularity is its ability to operate over a wide range of temperatures at corresponding low pressures. For example, a temperature of 700° F. involves a vapor pressure of only 88 pounds per square inch. Even more important in many applications is the accurate temperature control—through close regulation of system *pressure*—that Dowtherm brings to heat processing.

In the food industry—in the manufacture of plastics and rubber products—in every field, in fact, Dowtherm is providing uniform, precisely controlled heat that means improved product quality. Write to Dow for more complete information.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN
New York • Boston • Philadelphia • Washington • Cleveland • Detroit
Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Ontario

Dowtherm

CONTROLLED HEATING FOR HIGH TEMPERATURE PROCESSING

CHEMICAL COMMENTS

Dow Glycols Enter The Electrical Field

The five Dow Industrial Glycols, products of many-sided importance to a variety of industries, have extended their usefulness in the past few years into the electrical field. Modern small dry electrolytic radio condensers are made possible by virtue of the fact that glycols will dissolve appreciable quantities of boric acid. Diethylene Glycol is used successfully for this purpose, as it rates high as a non-volatile conductor that does not corrode aluminum.

Germicide Keeps Hydraulic Emulsions Bacteria-Free

The action of bacteria in the hydraulic systems of metal fabricating plants causes frequent shutdowns and costly hydraulic fluid replacements. This trouble can be eliminated by the use of as little as one part Dowicide A per one thousand parts of the soluble oil-water hydraulic fluid. This application of the Dowicides has been used with excellent results with other systems employing soluble oils.

Methocel Keeps Pigments Stable in Paints

Methocel (Dow Methylcellulose) is proving useful in many ways in the paint industry and especially to manufacturers of water-base paints. It keeps pigments from flooding, settling or caking, provides thickening and binding action, and also serves as a pigment disperser. Its protective colloid action insures emulsion stability. In addition, its controlled viscosity prevents undue penetration and assures excellent brushing characteristics.

Further information on any of these chemical developments is available on request.

50th Anniversary 1897-1947

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

NEW PRODUCTS & PROCESSES

Peracetic Acid, 40% NP 542

Peracetic acid, although known for a long time, has been a laboratory item in the past. Concentrated solutions could be made only by laborious preparation of high-concentration hydrogen peroxide which, upon reaction with acetic acid, forms peracetic acid. Large scale production of hydrogen peroxide of 90% concentration by Buffalo Electro-Chemical Co., Inc., has made it possible to devise a commercially useful process for the manufacture of peracetic acid. This new oxidizing agent is now available in limited quantities in form of a stable, 40% solution, containing 8.6% active oxygen.

Aliphatic peracids, characterized by the —COOOH group, allow the carrying out of oxidation reactions not possible with other peroxygen compounds of the peroxide type, containing the —OOH group.

Solutions of peracetic acid are efficient bleaching agents for various textiles, for proteins and generally for alkali-sensitive materials. They are effective in acid and neutral, as well as in alkaline, solution. Bulk and emulsion polymerizations can be carried out using peracetic acid as polymerization catalyst. Bacteria and other micro-organisms are killed rapidly by contact with very dilute solutions, making this chemical potentially useful as an efficient sterilizing and disinfecting agent. Enzyme systems are inactivated by peracetic acid solutions. This is of importance to the food processing industry, where this reaction may be used to prevent browning of cut fruits and vegetables, to stop flavor changes due to enzymatic action, etc. Peracetic acid solutions further permit one to carry out various reactions important in organic synthesis. Hydroxylation or epoxidation of olefinic double bonds is possible in an efficient reaction. Substituted benzene or naphthalene rings undergo splitting by reacting with peracetic acid; e.g., oxidation of phenol to muconic acid, or of β-naphthol to *o*-carboxycinnamic acid. Sulfides are oxidized to the corresponding sulfones, anthracene to anthraquinone, etc.

Hydroquinone Derivatives NP 543

Tennessee Eastman Corp. is now making available in commercial quantities a number of hydroquinone derivatives which until recently were obtainable only in laboratory amounts.

The use of hydroquinone as an antioxidant and stabilizing agent for fats, oils, and resin monomers is restricted by its low oil solubility and high water solubility. To overcome these restrictions, Tennessee Eastman has produced two simple derivatives: hydroquinone monomethyl ether and 2,5-ditertiary butyl hydroquinone. Both of these derivatives are considerably more oil-soluble and less water-soluble than hydroquinone. In addition, both show less tendency to discolor. The monomethyl ether is presently in use as a stabilizing agent in several textile lubricating-oil formulas. Because of the stability of the ether group, this compound is a promising raw material for organic syntheses, and it has many possibilities in the fields of drugs, cosmetics, and dyes.

2,5-Ditertiary butyl hydroquinone is a suitable preservative in both synthetic and natural rubber compositions, as well as in vegetable fats and oils. It is a good polymerization inhibitor for styrene and other resin monomers. Nonstaining and nondiscoloring, it is particularly useful for stabilizing latices and white stock such as are employed in many mechanical rubber fabrications. According to the company, this chemical is the first new nonstaining antioxidant for rubber that has appeared in several years.

Hydroquinone dimethyl ether, another derivative, is very stable, and is unaffected by boiling acids or alkalies. Since the ring hydrogens are labile, it has many possibilities in organic syntheses. This chemical has a very pleasing fragrance of sweet clover. For this reason, it is finding acceptance in the perfume industry, particularly in the formulation of soap perfumes. It is also useful as a weathering agent for paints and plastics, and is of interest for sun-tan lotions and creams.

Further processing of hydroquinone dimethyl ether leads to aminohydroquinone dimethyl ether, a valuable intermediate in the manufacture of certain naphthol dyes—as is its homolog, aminohydroquinone diethyl ether. These two compounds are commercially available in a pure form for the first time.

Surface Treatment For Polystyrene NP 544

The Nash-Kelvinator Corp., in conjunction with the Bjorksten Research Laboratories and the Bee Chemical Co., has announced a new treatment which enables use of polystyrene, costing approximately 28¢ per lb. in applications previously requiring the use of other plastic materials costing from 65 to 80¢ per lb. This discovery will greatly increase the field of use of styrene resins.

The new treatment makes possible a saving of $.35 to $.52 per square foot of treated plastic surface, when the plastic panel is ¼" thick. For heavier articles, the savings are greater in proportion. The figures stated can be further materially improved if a solvent recovery system is installed.

The treatment is known as "Logoquant". It is fully developed for production line application, either by spraying or dipping, and is being adopted for use by Nash-Kelvinator. It does not require special equipment nor curing at high temperatures. The treatment can be completed in 15 minutes, using standard equipment.

The "Logoquant" treatment depends on actual fusion between the polystyrene and resistant materials. It is not a mere surface coating; the treated polystyrene is visually indistinguishable from untreated polystyrene, even when transparent polystyrene is used. The treated surface cannot be peeled off by any known mechanical means.

Several years ago a study by the Nash-

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES 522 Fifth Ave., New York 18, N. Y. (10-7)

Please send me more information, if available, on the following items. I understand that nothing further may be available on some of them.

NP 542 NP 543 NP 544 NP 545 NP 546 NP 547 NP 548 NP 549 NP 550 NP 551 NP 552 NP 553 NP 554 NP 555

Please Print:

Name ..... (Position) .....

Company .....

Street .....

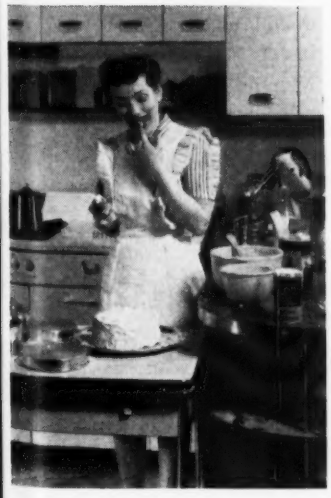
City .....Zone.....State .....

VICTOR Chemicals

FOR 50 YEARS... VICTOR CHEMICALS for everyday living

for... BAKING

VICTOR CHEMICAL WORKS



Victor Calcium Phosphate, because of its controlled leavening action, is widely favored in the manufacture of cookies and other baked goods. Its popularity depends upon the fact that cookie dough so leavened will not expand until oven heat is applied. Hence, when a large batch of dough is run through a volume depositor, uniform size and weight of the cookies are assured throughout the complete run. ¶ Victor Chemicals used in the baking industry include: **Diammonium Phosphate** (control the pH of soda crackers), **Monoammonium Phosphate** (yeast, yeast foods and bread improvers), **Calcium Phosphates** (phosphate baking powders, angel food cakes, self-rising flour, cookies, pancake flour, prepared cake mixes, bread improvers, and as a rope preventive in bread), **Phosphoric Acid** (yeast), **Sodium Acid Pyrophosphate** (baking acid in prepared doughnut flours, cake mixes, commercial baking powders, and baking creams).

VICTOR CHEMICAL WORKS, 141 W. Jackson Blvd., Chicago 4, Ill.

NEW YORK · KANSAS CITY · ST. LOUIS · NASHVILLE · GREENSBORO, N. C.

Plants: NASHVILLE · MT. PLEASANT, TENN. · CHICAGO HEIGHTS, ILL. · VICTOR, FLA.

ANSUL SO_2 IN INDUSTRY

The versatility of Ansul Liquid Sulfur Dioxide in industrial practices is illustrated by the following examples:

ACIDITY . . . . . $SO_2 + H_2O \rightarrow H_2SO_3$

ANTICHLOR . . . . . $SO_2 + 2H_2O + Cl_2 \rightarrow H_2SO_4 + 2HCl$

ANTI-OXIDANT . . . $SO_2 + Na_2O_2 \rightarrow Na_2SO_4$

HYDROSULFITES . . . $2SO_2 + Zn \rightarrow ZnS_2O_4$

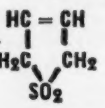
SULFOXYLATES . . . . $2SO_2 + 2Zn + 2CH_2O + H_2O \rightarrow (CH_2O \cdot HSO_2)_2\,Zn + ZnO$

NEUTRALIZATION . . $2SO_2 + 2NaOH \rightarrow 2NaHSO_3 \rightarrow Na_2S_2O_5 + H_2O$

SULFURYL CHLORIDE . $SO_2 + Cl_2 \rightarrow SO_2Cl_2$

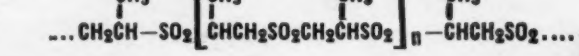
SULFITES . . . . . $SO_2 + H_2O + 2NH_3 \rightarrow (NH_4)_2SO_3$
$SO_2 + CaCO_3 + H_2O \rightarrow CaSO_3 + CO_2 + H_2O$
$SO_2 + Ca(OH)_2 \rightarrow CaSO_3 + H_2O$

THIOSULFATES . . . . $SO_2 + S + 2(NH_3) + H_2O \rightarrow (NH_4)_2S_2O_3$

SULFONES . . . . . $SO_2 + CH_2{=}CHCH{=}CH_2 \rightarrow$ 

GOLD RECOVERY . . . $3SO_2 + (Au \cdot 2HCl \cdot 2HNO_3)\ (\text{aqua regia}) + 2H_2O \rightarrow Au + 2HCl + 3H_2SO_4 + 2NO$

CHROME TANNING . . $3SO_2 + Na_2Cr_2O_7 \cdot 2H_2O \rightarrow 2Cr(OH)SO_4 + Na_2SO_4 + H_2O$

PLASTICS . . . . . $SO_2 + CH_3CH{=}CH_2 \rightarrow$ 

In addition Ansul Liquid Sulfur Dioxide is being currently used as a bleaching agent • purifier • preservative • solvent • fumigant • protective atmosphere in magnesium fabrication • refrigerant and in polymerization, etc.

Consult Ansul Technical Staff relative to the development of these and other applications for SO_2 in your processes.

Write for treatise on Liquid Sulfur Dioxide and request bulletins describing the specific application in which you are interested.

LIQUID Sulfur Dioxide ANSUL*

PHYSICAL PROPERTIES

Chemical formula	SO_2
Molecular weight	64.06
Color (gas and liquid)	Colorless
Odor	Characteristic, pungent
Melting point	−103.9° F. (−75.5° C.)
Boiling point	14.0° F. (−10.0° C.)
Density of liquid at 80° F.	(85.03 lbs. per cu. ft.)
Specific gravity at 80° F.	1.363
Density of gas at 0° C. and 760 mm.	2.9267 grams per liter (0.1827 lb. per cu. ft.)
Critical temperature	314.82° F. (157.12° C.)
Critical pressure	1141.5 lbs. per sq. in. abs.
Solubility	Soluble in water
Purity	99.9+% (by wt.) SO_2 (H_2O less than 0.01%)

*REG. U.S. PAT. OFF.

For your METHYL CHLORIDE *applications . . . . Use* ANSUL METHYL CHLORIDE

ANSUL CHEMICAL COMPANY
INDUSTRIAL CHEMICALS DIVISION, MARINETTE, WIS.
60 E. 42nd St., New York — 535 Chestnut St., Philadelphia

Kelvinator Corporation revealed that polystyrene resins would be excellently adapted for many automotive uses. However, three major disadvantages ruled out such use:

1. Proneness to scratching of the surface.
2. Destructive action of common cleaner fluids, gasoline and oil.
3. Electrostatic attraction for dust. Polystyrene panels installed in automobiles could become so strongly electrostatic that dust wiped from them would fly from the dusting rag directly back to the panel.

Nash-Kelvinator Corporation employed the Bjorksten Research Laboratories to work out a practical solution to this problem; the "Logoquant" treatment is the result of this work.

Nash-Kelvinator Corporation has licensed the Bee Chemical Co. to manufacture the "Logoquant" materials, from whom it can now be obtained by any plastic manufacturer or user desirous of applying the treatment.

"Logoquant" treatment imparts to polystyrene a mar resistance 18% higher than that of untreated polystyrenes, 7% higher than that of a good spar varnish, and in the same order of magnitude as much more expensive plastics. These measurements were made by the official ASTM method (D 673-44).

When marred, "Logoquant" treated polystyrene can be polished to clearness considerably more easily than untreated polystyrene; it is considerably less electrostatic than untreated material; and it resists wiping and brushing with solvents which attack polystyrene.

Flameproofer for Textiles NP 545

A new organic flame-proofing compound, Antoxol, is manufactured by Eronel Industries.

This new compound will not alter the color, appearance, sheen or feel of the most delicate fabrics, and it is of especial note that independent laboratory reports show that it actually increases the tensile strength of the material.

Antoxol will not powder off because of its balsamic resinous nature, thus assuring permanent protection. Any fabric so treated can be dry-cleaned repeatedly. In addition, Antoxol is nontoxic and nonirritating.

Quaternary Ammonium Disinfectant NP 546

A crystalline form of the new odorless bactericide, Hyamine 1622, which has proved 200 times more effective against germs than carbolic acid, has been developed in the laboratories of the Rohm & Haas Co.

This quaternary ammonium compound is not only odorless in itself but also acts

DIISOBUTYL KETONE

Ketones

ETHYL BUTYL KETONE

Available in commercial quantities —to give you formulating freedom in the manufacture of lacquers and synthetic resin coatings.

	Diisobutyl Ketone	Ethyl Butyl Ketone
FORMULA	$C_4H_9COC_4H_9$	$C_4H_9COC_2H_5$
Boiling Point at 760 mm. Hg	168.1°C.	147.8°C.
Toluene Dilution Ratio at 20°C.	1.5	2.6
½ sec. R.S. Nitrocellulose Viscosity, 18% "Vinylite" resin VYHH Solution	Gel Structure	112 cps
Evaporation Time (Butyl Acetate = 8 hr.)	44 hr.	14 hr.
Weight per gal. at 20°C.	6.73 lb.	6.8 lb.
Specific Gravity at 20/20°C.	0.8089	0.8197

DIISOBUTYL KETONE

Dispersant—Best all around resin dispersant available for making organosols based on VINYLITE resin VYNV. Makes possible semi-hard and hard metal coatings containing little or no plasticizer, and aids in the preparation of highly plasticized coatings for cloth and paper.

Solvent—Retards premature evaporation in brushing lacquers, and reduces blushing in air-dried lacquers. Gives better flow-out and gloss to baked finishes.

ETHYL BUTYL KETONE

Dispersant—Produces fluid organosols having good viscosity stability on aging. Permits high solids content and makes good, clear films without checking ("mud cracking").

Solvent—Good solvent in both air-dried and baked finishes based on nitrocellulose or vinyl resins. Less active in lifting undercoats.

Intermediates—When condensed with amines and other chemical groups capable of reacting with the carbonyl group, these ketones give compounds of interest as inhibitors, rubber accelerators, dyes, pharmaceuticals, and insecticides. Ask for technical literature on diisobutyl ketone F-6934, and ethyl butyl ketone F-6918—when writing please address Dept. D-10

The word "Vinylite" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

CARBIDE and CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

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WE'VE DONE IT FOR ZOO KEEPERS AND "VETS"

SINCE its introduction as a general purpose deodorant some fifteen years ago, NEUTROLEUM has been put to hundreds of interesting uses. One of these is the control of animal odors. Placed in the corners of cages, kennels or animal houses, a drop or two of this very efficient, low-cost deodorant helps to maintain a clean, fresh atmosphere about the premises of zoos, pet shops, veterinary hospitals and the like. Its proper use, coupled with a rigid program of cleanliness, will go a long way toward removing the problem of animal odors as a matter of concern for the veterinarian, zoo keeper or kennel operator.

PERHAPS WE CAN DO IT FOR YOU!

Unpleasant industrial odors are a frequent source of annoyance, discomfort and expense to manufacturers. As the by-product of chemical process or manufacture, an offensive odor can be detrimental to personnel efficiency and morale; as residual odor in the finished goods, it can greatly retard that product's sale. In either case, the presence of such odor is not only costly, but *unnecessary*, for as likely as not it can be modified or entirely eliminated by the use of appropriate deodorants. NEUTROLEUM may not be the answer, but we have dozens of other neutralizing specialities from which to choose. And if none of these will do, our technical staff is well equipped to study the problem and work out an effective solution. Therefore, if you or your company are faced with an industrial odor problem, it will obligate you in no way to explain it to our Technical Division and find out if they can solve it for you.

FRITZSCHE *Established* 1871 *Brothers, Inc.*

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Ga., *Boston, Mass., *Chicago, Ill., Cincinnati, Ohio, Cleveland, Ohio; Dallas, Texas, Detroit, Mich., *Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., *St. Louis, Mo., *Toronto, Canada and *Mexico, D. F. FACTORIES: *Clifton, N. J. and Seillans (Var), France.*

as a powerful deodorizer. The powder greatly reduces both shipping and usage problems; it eliminates bottles, problems of breakage and the excess weight of glass containers. Furthermore, it can be converted into tablet form, or packed in one-dose containers, thus permitting more accurate measurements and more convenient application.

Unlike hot-water rinses in which the utensils must be held at 180° for at least two minutes, the compound can be used readily without special equipment and has none of the odor, instability, nor excessive loss of germicidal action in the presence of organic contamination which characterizes chlorine rinses.

Developed as a result of research on an all-purpose bactericide for both sanitation and drugs, Hyamine may be used on almost any object which requires a disinfectant. The product is a white crystalline powder, readily soluble in water, possessing very low toxicity to warm-blooded animals. It is so powerful that it is effective against streptococci in concentrations as low as one part in 50,000. It is stable, non-inflammable, and will not injure fabrics, metals or paint surface. It is non-irritating and at proper concentration may be used directly on the skin or in contact with mucous membranes. Its solutions resist light, air, or normal temperature variations, remaining stable for long periods. Their effect on rubber, plastics and glassware is no stronger than that of distilled water.

Hyamine 1622 is available as 100 per cent material and is supplied by the manufacturer as a raw material for processing industries.

Continuous Grease Process NP 547

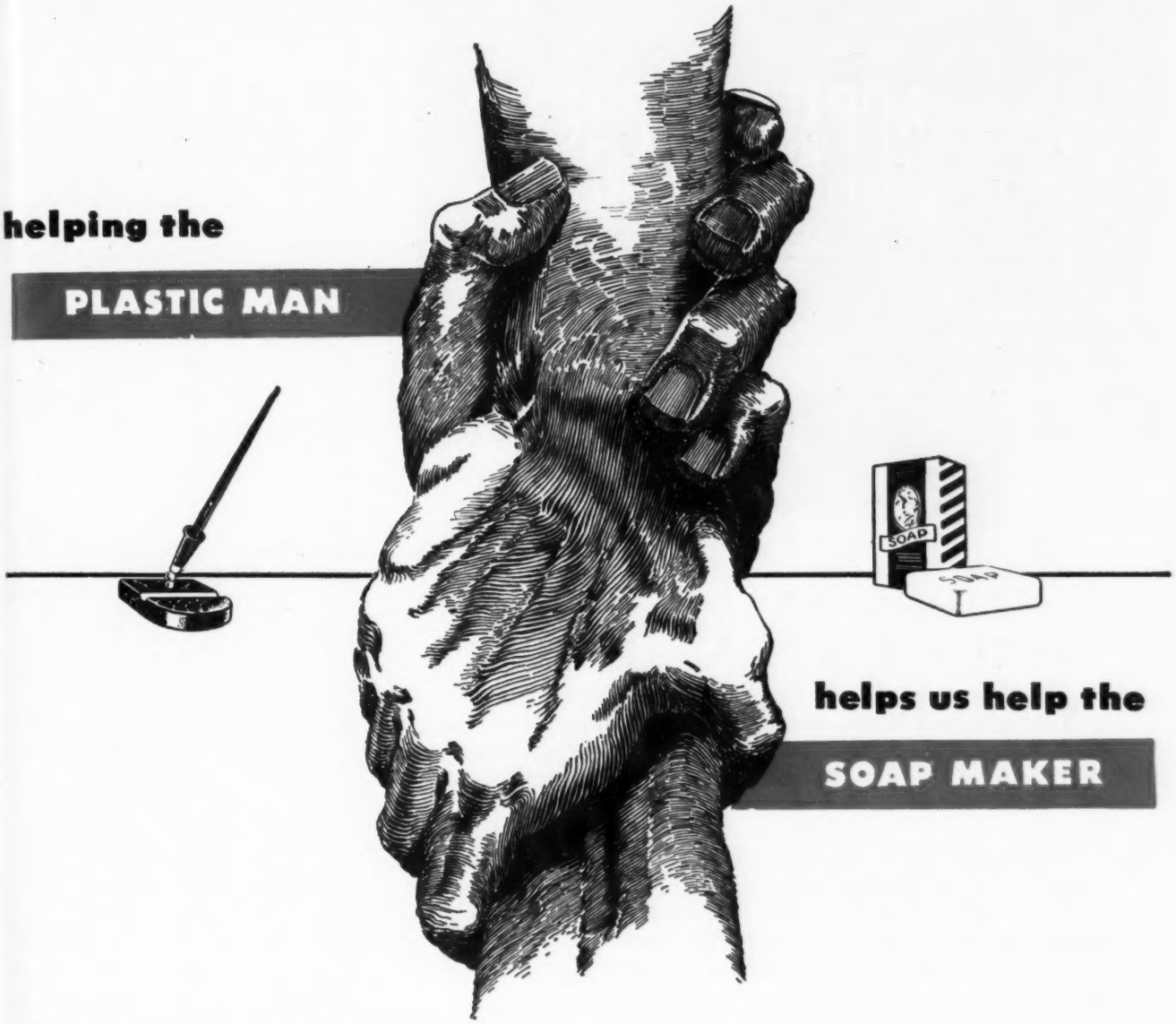
A new process for manufacturing greases and blending oils is known as the Flow-Master process. It enables grease manufacturers to eliminate all batch processing. The entire system is automatic and, once set up, produces a homogeneous, perfectly uniform product day after day. Standard capacities process up to 1,000 gallons per hour. Special units can be furnished to produce up to 3,500 gallons per hour.

The base ingredient is conducted from an autoclave into the subsequent processing units. Additional liquid base ingredients are proportioned into the mixture by pumps in any quantity desired. All these ingredients are thoroughly mixed by means of a Flow-Master Roto-Feed continuous mixer. At this point, any dry additives may be added by means of a dry proportioner, and water or other liquid additives proportioned into the mixture by another Flow-Master pump.

The heart of the new process is the Flow-Master temperer (pictured here), which thoroughly processes all the ingredients under temperature control. The temperer blends, mills, and homogenizes

helping the

PLASTIC MAN



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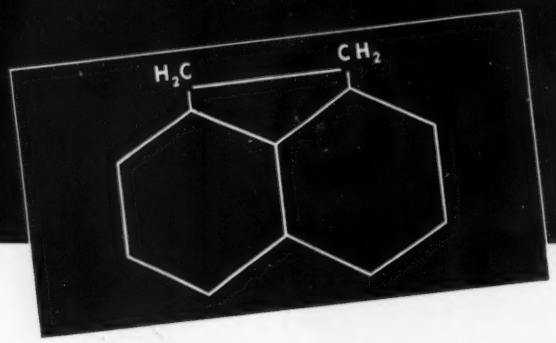

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● The chemical reactions of Reilly Acenaphthene commend it to research workers in rubber compounding, dielectric materials, paints, dyestuffs and other organic synthesis. This unique hydrocarbon may be nitrated, sulfonated, halogenated, and otherwise processed.

The dehydrogenation of Acenaphthene yields Acenaphthylene, a monomer which readily polymerizes to a high melting point polymer having unusually good electrical insulating properties. Acenaphthylene also is applicable as a rubber extender, compatible alike with natural and synthetic rubbers.

The oxidation of Acenaphthylene gives Naphthalic Acid, a dibasic acid which reacts to give interesting resins of the alkyd type, Particl oxidation gives Acenaphthenequinone, a reactive compound which is a starting material for several vat dyes.

Your inquiries on Acenaphthene or other Reilly hydrocarbons, acids or bases will have prompt attention.

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Reilly Coal Tar Chemicals For Industry

all the ingredients and passes them along to packaging units without the need of additional pumps. Characteristics of the finished product are under control at all times.

The advantages of process include continuous production, absolute uniformity of product, superior quality and homogenity of product, and high production at low initial and operating cost. The process is already being used successfully by some of the largest grease producers. It was developed by Marco Co., Inc.

Commercial-Scale Biochemicals NP 548

In an effort to develop a blood plasma substitute during the war, Armour Laboratories has applied the methods of Cohn and coworkers in the pilot plant to the fractionation of bovine blood, as well as in the isolation of plasma albumin in crystallized form. Important methods by Northrup, Kunitz, and Fevold have also been developed to make useful and interesting enzymes available in crystallized form for investigational use.

The following biochemicals are now available:

Bovine plasma albumin, crystallized
Fraction V (bovine albumin)
Fraction I (bovine fibrinogen)
Trypsin, crystallized
Chymotrypsin, crystallized
Pepsin, crystallized
Ribonuclease, crystallized
Lysozyme, crystallized
Adenosine Triphosphate

Metal Lubricant NP 549

The Glycolube series of lubricating compounds (patents pending) developed especially for drawing, sheeting and stamping non-ferrous metals is now being manufactured by Glyco Products Co. Inc.

The experience of a limited number of the largest metal-working mills in the country to which these products have been made available has demonstrated that they make possible increased operating speeds and considerably prolonged life of the dies with which they are employed.

Glycolubes yield a brighter product, automatically apply a film which acts as a temporary corrosion inhibitor, and permit continuous lubrication. Since Glycolubes do not break down during operation or produce scum, the conventional necessity for continually renewing or discarding the lubricant is eliminated. In operations where Glycolube is to be added, this can be done conveniently and without interrupting the process.

Glycolubes are available in various forms, ranging from liquids to solids and from water-soluble or water-dispersible materials to oil-soluble materials. One compound in the series of 12 compounds is both water and oil dispersible.

Being flexible in nature, Glycolubes can

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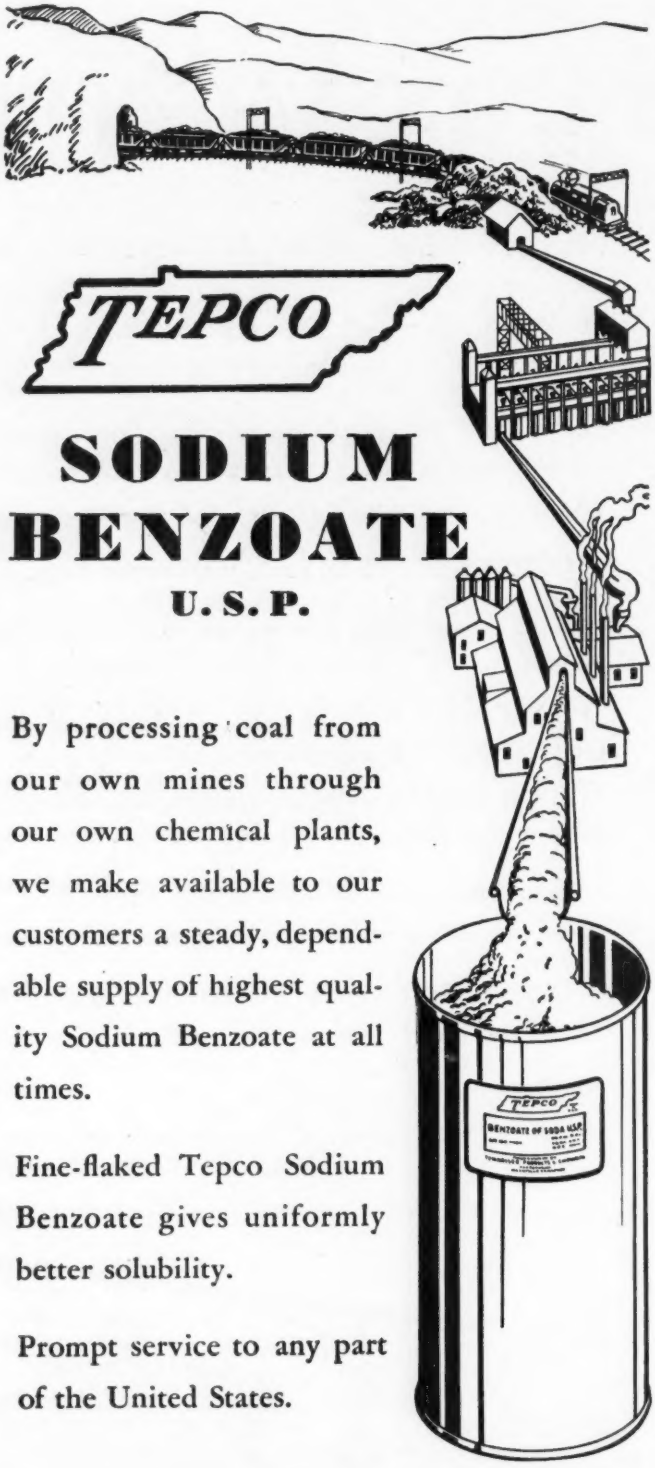

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be delivered with various combinations of properties and thus can be tailored to suit specific operating requirements. Certain members of the Glycolube family are designed for wet drawing, others for dry drawing.

For wet drawing, a solution of 2 to 5 per cent Glycolube and water usually is the most satisfactory. In some processes, the stock to be drawn dry may be dipped into a solution of the Glycolube before the operation, then allowed to dry and then processed. This makes possible reduction of the amount of lubrication at the die.

Where a series of dies are applied in dry drawing, the use of Glycolube often reduces the number of lubrication boxes required.

Coating for Concrete NP 550

Carbo floor coat is a decorative and protective coating for concrete walls and flooring manufactured by Carbozite Protective Coatings, Inc. This coating seals surface pores without a hard slippery finish, and prevents absorption and attack from mild acid and alkali solution, oils and detergents, and water.

Although especially designed for concrete, Carbo floor coat is also used for wood flooring. Its decorative qualities enhance its value for use in private and public buildings as well as for industrial applications.

Metal Fluxes NP 551

The Linick Chemical Co. has developed two new fluxes (for use principally with precious metal alloys) containing traces of a titanium salt.

One of these is a "hard" soldering flux which, because of its titanium content, causes the solder to flush quickly into the finest crevices, leaving the solder mirror-bright. The flux is self-pickling and requires no after-treatment of the metal.

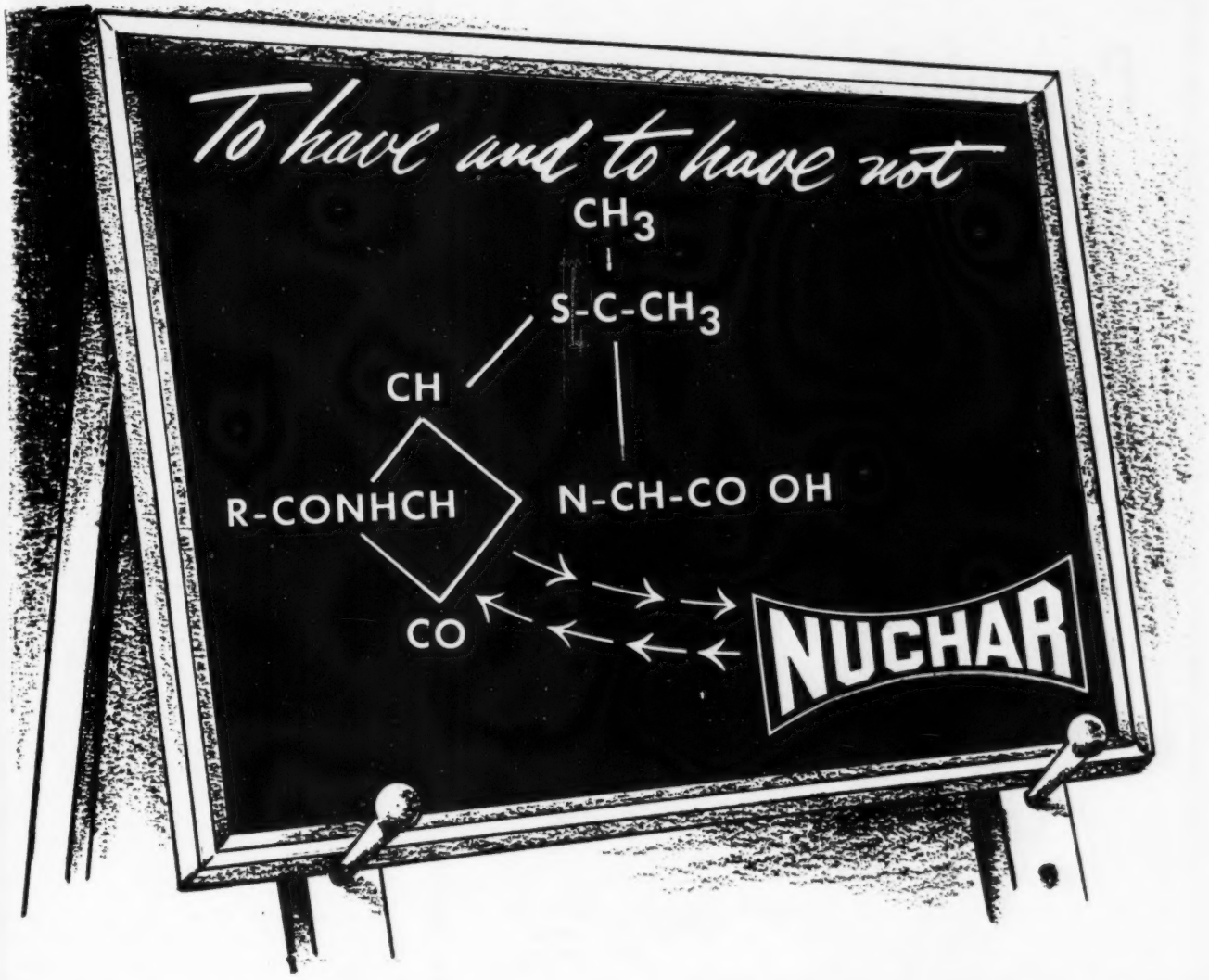
The other is a cover or casting flux which prevents oxidation of the metal and also removes nitrogen from the metal. Since it is a reducing flux, it changes oxides back to the metal and leaves the surface of the cast alloy bright and clean. It is especially valuable with alloys of palladium and all gold alloys.

This is said to be the first time that a titanium salt has been used in such fluxes.

Neoprene Paint NP 552

A new acid-resistant neoprene paint may be used as a coating for the protection of surfaces which are subjected to exposure to fats, oils, and greases or corrosive chemical liquids, solids or fumes.

It adheres well to wood, metal and other smooth surfaces, and has no odor. Re-



This has been reported as the probable formula of the wonder drug . . . Penicillin. In its production, Nuchar Activated Carbon is used to pick up the Penicillin from a dilute solution, after which the Penicillin is taken away from the Nuchar by an elution method. The development of this adsorption and desorption technique was responsible for the rapid steps made in producing Penicillin on a large scale for use by the armed forces.

With similar adsorption and desorption techniques, Streptomycin and other anti-biotics can be concentrated and recovered by using Nuchar Activated Carbon. This principle should also find application in the recovery and purification of many rare biologicals, chemicals and pharmaceuticals, some of which may still be in the research or pilot stage. Adsorption and desorption methods may lend themselves to recovery of valuable materials from trade wastes and should be investigated by every industry.

Nuchar Activated Carbon has been finding wider and wider applications in the chemical industry because of the great amount of increased knowledge developed through research during the war period. Our technical staff will be glad to furnish you with valuable data on the use of Nuchar Activated Carbon in your process. Write today for a generous sample and full details.

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VIRGINIA *Chemicals*

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sisting abrasive action, this rubber-like film will not chip or crack. It dries completely in several hours, requiring no oxidation period.

The product is a solution of neoprene in an aromatic solvent with the addition of other materials to yield a chemically resistant paint. The color of the film is translucent amber. Miscible solvents are aromatics, ketones, esters, chlorinated hydrocarbons; diluents include aliphatic hydrocarbons, mineral spirits, turpentine. No special treatment of the surface to be painted is necessary.

The paint may be flowed from a full brush. A surface free from gaps, ridges, and pinholes will prevent chemicals from penetrating beneath the paint and causing localized attacks which may spread to the film. The paint may be sprayed if properly thinned with toluol or other thinners.

It is made by Union Bay State Chemical Co.

Rubber Component NP 553

A new bloom inhibitor, Natac, which has wide application in natural rubber and mixtures of natural rubber and GR-S has been put on the market by J. M. Huber Corp.

Natac is a modified resin acid which has inherent tack and is neutral with thiazole acceleration in natural rubber. 2 to 4 parts of Natac per 100 rubber hydrocarbon will retard fatty acid and sulphur blooms and impart a lasting tacky surface to products in which it is compounded. Tire coat and friction stocks, tire repair materials, laminated mechanical parts, footwear friction, gum parts and similar rubber compounds may be worked longer with reduced blooming tendencies usually caused by cold weather, lay-over, or rapid chilling.

Natac may be safely added to present compounds or used in place of other softeners without affecting the physical properties of the cured stocks. It is a solid with a melting point (Ball & Ring) of 145°-155° F., shatters readily at room temperature and requires no previous melting before adding to the batch.

Sealing Tape NP 554

Nu-Chromseal tape, a versatile improved form of Chromseal aircraft sealing tape, now being made in three thicknesses, is not affected by gasoline, oil or water and may be used where required baking temperatures run as high as 375° F. It is adhesive on both sides, clean to handle and rates high in dielectric values.

The consistency of Nu-Chromseal tape allows for easy tailoring around radical contours and excess material can be readily trimmed with the finger nail or a blunt instrument.

Chromseal was used during the war for sealing pressurized cabins, fuel tanks and plastic enclosures. Nu-Chromseal, in addition to numerous aircraft aplications,

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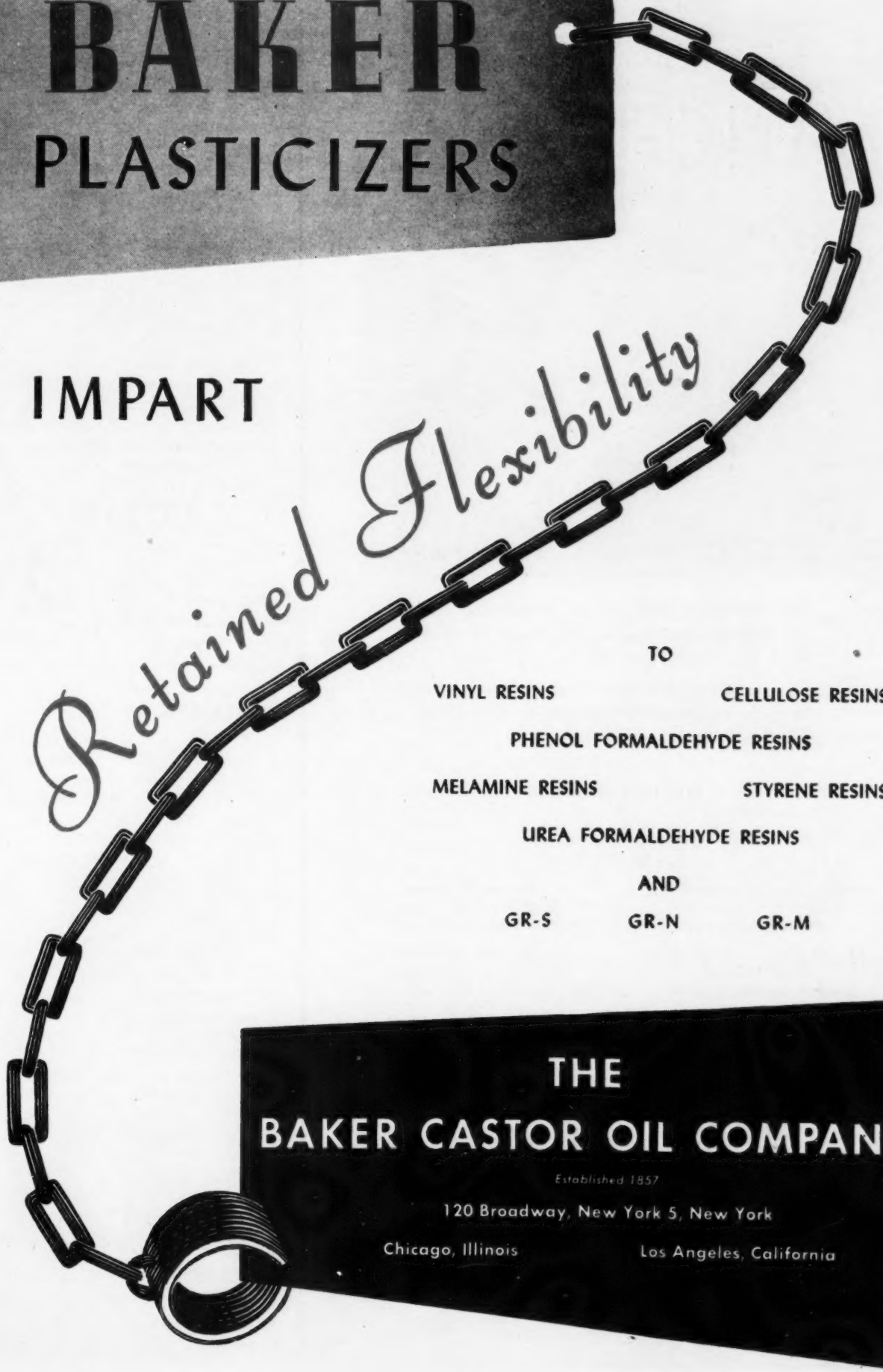

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is advantageous for automobile weatherproofing, boat and container sealing, metal cabinetry, gaskets, glazing and insulation purposes. It was developed by Pittsburgh Plate Glass Co.

Synthetic Adhesive NP 555

A new adhesive is being made that has more than twice the shear-resistance strength of brass rivets in anchoring automotive brake linings and eliminates all danger of rivet-scoring of brake drums.

Two chief advantages of the adhesive, called Plastilock 601, over the conventional method of attaching brake lining by rivets, according to its maker, The B. F. Goodrich Company, are (1) the brake lining can be worn right down to the shoe before need for replacing, instead of only about half way, and (2) there is no possibility of rivet heads cutting ridges in the brake drum.

Tests conducted by an automotive concern showed that rivets start to shear at 3,500 pounds and fail at 5,000, while lining attached by the new adhesive held fast until 11,000 pounds of shearing pull were applied.

The Plastilock 601 was developed specifically for brake lining use but is one of a new series of adhesives that will have diverse applications. Available in either tape form or liquid, it requires a fairly severe curing period of applied heat and pressure. The material will be available in the near future for relining brakes of commercial and passenger vehicles.

New Product Briefs

● A new lead pigment, claimed to be superior for paint manufacture, is soon to be produced by National Lead Co. Made by mixing finely-divided silica and lead oxide, adding sulfuric acid, drying and firing, the individual pigment particles are coated with a thin, adherent layer of lead silicate and lead sulfate.

● The most potent of all female sex hormone has been synthesized recently, according to Dr. Carl Miescher, Ciba Ltd., Basel, Switzerland. Chemically, it belongs to the doisynolic acid group. Doisynolic acid can be prepared by treating natural hormones with caustic potash but its real structure has not heretofore been determined.

● Positive proof that element 61 can be made artificially in atomic piles was offered recently by J. A. Marinsky and L. E. Glendenin of the Clinton Laboratories. The element was first "discovered" in 1926.

● The trend toward commercial utilization of starch is high-lighted by progress which has been made in the manufacture of a polyglucoronic acid by controlled oxidation. The acid was prepared by oxidizing dry starch with oxides of nitrogen in the presence of an organic medium in a research project being carried through at Purdue University.

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Kelco Algins do *two* jobs for this railroad man—help to keep his locomotive boiler feed free of sediment and make his morning shave less of a chore.

Surprisingly versatile, Kelco Algins not only suit such widely-distant applications as colloids for boiler feed water compounds and shaving creams; they are equally applicable as:

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Thickening Agent for Textile Printing Pastes

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Gel-forming Agent for Dental Impression Compounds

Suspending Agent for Chocolate Milk Drinks

— And countless other diversified commercial processes.

Kelco Algins are products of nature, rigidly processed to insure uniform results. They are non-variable, readily adjust themselves to critical changes of environment. Additionally, they are easy to handle and economical. A request on your letterhead will bring complete information in regard to their adaptation to your requirements.

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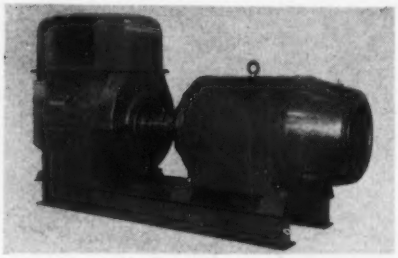
NEW EQUIPMENT

Totally Enclosed Unit-Cooled Generator QB 322

The new line of totally-enclosed, unit-cooled generators of the Motor Divisions of the General Electric Co. are for use in



motor-generator sets or in other generating applications in any non-hazardous atmosphere where the ratings involved make totally-enclosed fan-cooled construction impractical.

The new generators are available in ratings from 30 to 150 kw. Cooling of the generator is accomplished by an air-to-air surface cooler which maintains safe winding temperatures at all times. When used in a motor-generator set with a G-E totally-enclosed unit-cooled d-c motor, the entire unit is completely assembled at the factory.

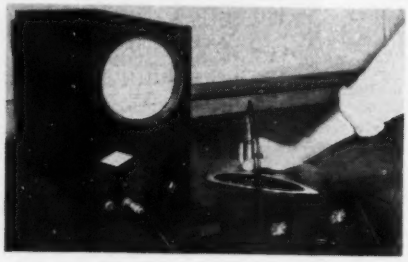
Squirrel-Cage Induction Motor QB 323

The new two-pole squirrel-cage induction motor is desirable for such high-speed applications as oil pipe line pumps, centrifugal pumps, compressors and blowers. It is an addition to the "Heavy-Duty" line of Electric Machinery Mfg. Co. and is rated from 200 to 700 hp at 3600 rpm; NEMA Class B starting (normal torque, low current), favorable for across-the-line starting. It has drip-proof construction and a fabricated steel frame.

Motor is engineered to meet the exacting requirements of high-speed service: Kolene Process centrifugally-cast bearing sleeves, pressure-lubricated bearings are available, and split bearing brackets (dowled) permit easy access to bearings.

Supersonic Flaw Detector QB 324

The Reflectogage—a new instrument developed by Sperry Products, Inc. and utilizing supersonics for thickness measurement and flaw detection—will measure thickness of metals and other materials



where access from only one side is available. Maximum error in measurement is less than 2% of the thickness.

In operation a quartz crystal searching unit is applied to the oiled surface of the material and the oscilloscope pattern observed by the operator. A vertical deflection of the oscilloscope trace will indicate resonance of the sound beam within the material. The position of the vertical deflection along the horizontal axis is determined by the resonant frequency and is thus related to thickness. When thin pieces are being tested, this thickness is read directly from the superimposed calibrated screen. A different screen is used for each type of material and for each of four thickness ranges.

The Reflectogage is likewise readily adaptable for the production line testing of thin pieces, or bonded or clad materials, for internal defects or separations.

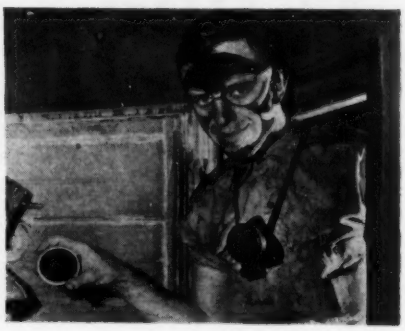
Silver Solder QB 325

All-State Welding Alloys Co., Inc., has a new silver solder with high capillary action and exceptional tensile strength. It has a low silver content (20%), giving a higher tensile strength. Because of its low cost it makes possible many jobs that were not previously done with silver solder.

It has a melting temperature of 1,430°F. and a shear strength of 145,000 psi. It is also recommended for use on steel, brass, copper, stainless steel, and inconel. It is available in wire, strip, or rings. This alloy, known as All-State No. 120 high-strength silver solder, is used with All-State No. 103 flux.

Respirator QB 326

A new respirator, incorporating a revolutionary new dust filter for protecting industrial workers exposed to poisonous and disease-producing dusts smaller in diameter than 24 millionths of an inch has been made available by American Optical Co. The new filter consists of a felt which has been chem-



ically treated so that its ability to prevent the passage of dust is 40 times greater than that of filters which have not been chemically treated.

Approved by the U. S. Bureau of Mines, the new AO R-2000 respirator and filter protect workers against toxic dusts such as lead, cadmium, arsenic, chromium, etc.; pneumoconiosis-producing dusts, free silica and asbestos, and the nuisance dusts, iron ore, coal, coke, aluminum, limestone, etc.

The new filter, ⅛" thick and slightly over five square inches in area, is the equivalent in dust filtering efficiency of previous untreated filters of the same thickness and 42 square inches or more in area.

This increased efficiency is accomplished without a proportionate increase in breathing resistance, thus making possible an approved respirator filter of the smallest area so far developed, reducing the weight of the respirator and provides an increased field of vision in both vertical and horizontal directions for respirator wearers. To prolong its life, the new filter is equipped with a gauze prefilter for catching larger particles of dust and dirt.

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QB 325	QB 330	QB 335	QB 340	QB 345	QB 350	QB 355
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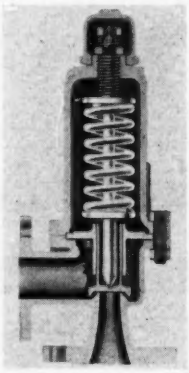
Farris Engineering Corp. has developed a new line of corrosion resistant safety and relief valves.

This resistance is accomplished by two factors in the design:

1. The use of "Hastelloy-C" for the inserted nozzle and the valve disc and, in



certain models, for the complete valve body, providing proof against the corrosive action of any of the acids or caustics normally handled on a commercial scale.

2. The complete isolation of all working parts of the valve behind a vapor proof "FarriSeal" curtain. This protective seal is a flexible material attached to the disc at one end and the flanged disc guide at the other, in such a way as to completely isolate the working parts from the gas or vapor within the body of the valve. The material of the seal may be of either rubber, "Neoprene" or any flexible metal designed to withstand the action of specific acids or caustics.

They are available with flange connections in sizes from ½ inch to 2 inches; with screwed connections in sizes from ½ inch to 1 inch.

Anti-Acid Pump Lubricant QB 328

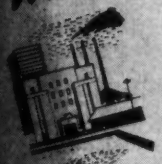
The new anti-acid pump lubricant of James K. Harbinson & Co. can be injected into the lantern ring using a grease cup in the usual way. This will facilitate lubrication while the pump is in operating service.

It can be readily applied as a coating or film to all metal surfaces and provide positive protection against direct acid or mild caustic attack or from the corrosive action of vapors. If the can is placed in boiling water for several minutes the compound will liquefy and can be brushed on metal surfaces of extended area.

Neoprene Covering for Wire Rope Slings QB 329

A new development in wire rope safety slings and cables manufactured by the Wire & Cable Division of the Wind Turbine Co. gives protection against weath-

Wherever there's water, there's pH...

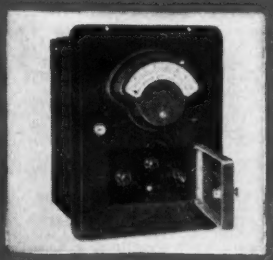


Beckman pH Control is the modern miracle tool with which industries of all types are boosting production efficiencies, reducing waste, obtaining better products at lower operating costs. No matter what your product or operation . . . whether metal finishing, power plant operation, agriculture, food processing, sewage and waste disposal, water supply, chemical processing, oil refining, textile manufacture—to mention only a few . . . if you use water or water solutions *anywhere*—in vats, tanks or flow lines—investigate the savings that can be made, *perhaps are already being made* by your *competitors*, with the aid of modern Beckman pH Control.

...and the leading name in pH is BECKMAN!

Practically every major advancement in modern glass electrode pH control has been pioneered by Beckman — the simplification of glass electrode equipment from a complicated laboratory set-up to today's practical, compact equipment . . . the introduction of completely automatic pH indication, recording and control . . . the development of High pH and High Temperature Glass Electrodes . . . these and many other Beckman-pioneered advancements make Beckman pH Equipment the most advanced obtainable.

There's a Beckman pH Instrument for every requirement

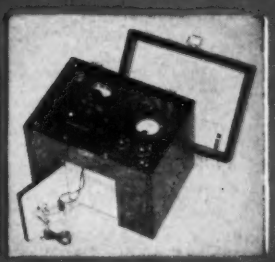


THE BECKMAN MODEL R

provides completely automatic large scale process control. Operates on standard AC current. Gives continuous pH indication and operates standard recording and regulating instruments for complete and continuous pH control.

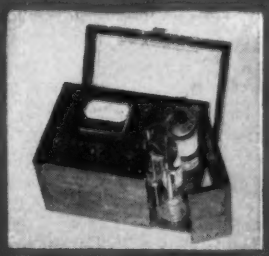
THE BECKMAN MODEL G

is particularly recommended for advanced research and laboratory pH investigations. It features an unusually wide range of special glass electrodes to meet every research and laboratory requirement.



THE BECKMAN MODEL H

combines compact portability with full AC operation. Recommended for industrial applications convenient to standard AC current supply. Uses standard Beckman Glass pH Electrodes.



THE BECKMAN MODEL M

combines simple operation with complete portability. Its entirely self-contained power supply is a vital feature in many plant and field applications. Uses standard Beckman Glass pH Electrodes and accessories.

BRING YOUR pH PROBLEM TO US

Our trained engineers will gladly study your requirements and make recommendations on the type of equipment best suited to your particular needs. No obligation, of course.

Send for this helpful free booklet! "What Every Executive Should Know About pH" — a non-technical discussion of pH, what it is, how it's used. A copy will gladly be sent you on request.

BECKMAN INSTRUMENTS
National Technical Laboratories, South Pasadena 17, Calif.

BECKMAN

INSTRUMENTS CONTROL MODERN INDUSTRIES

BUSY EXECUTIVES

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CHEMICAL INDUSTRIES

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Always at their finger tips, CHEMICAL INDUSTRIES is a dependable source of information. New chemicals, new uses, chemical reports and trends are but a few of the topics authoritatively discussed. Every executive in the chemical industry will profit by a personal subscription.

Prices are $5.00 a year; $8.00 for two years.

ering, abrasion and corrosive liquids by coating them after fabrication with neoprene, a tough but flexible synthetic rubber jacket.

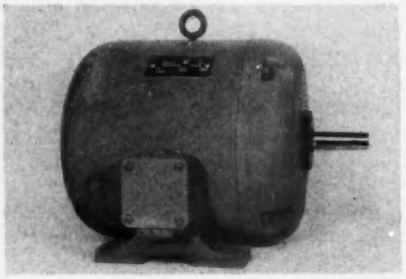
The neoprene jacket is about ⅛" thick and forms a close bond with the metal it protects, thus sealing the wire rope from the elements.

In addition to greater ease of handling, the neoprene jacket guards the man who handles the cable from the needle-like wires that sometimes protrude and cause injury.

Neoprene jacketed wire rope can now be supplied on any of the company's one and two arm Trylon safety slings in minimum breaking strengths up to 30,000 pounds. Cables fabricated either with or without end thimbles can be supplied in lengths up to 50 feet.

Totally Enclosed 3-Phase Motors QB 330

The Kato Engineering Co. has tooled up for building 1½, 2 and 3 H.P. three phase motors. The average readings on a quantity of 1½ H.P., 1160 R.P.M. motors are as follows:



Amps	2.6
Volts	440
Power Factor	67%
Foot Pounds	6.9
Cycles	60
R.P.M.	1160

The rotor is equipped with Norma-Hoffman grease sealed cartridge type bearings. The holes in mounting feet are spaced in acordance with N.E.M.A. and special cast iron outlet box threaded for proper size of conduit is mounted on side of each motor. Frame and endbells are of cast iron with lifting ring.

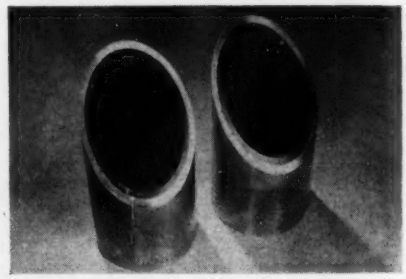
Corrosion and Wear Resistant Welding Alloy QB 331

EutecTrodes 67 AC and 670 DC of the Eutectic Welding Alloys Corp., have a high alloy content developed for joining, filling, filleting and overlaying all types of steel where high tensile and impact strength; good heat, corrosion, and wear resistance; and high hardness values are required. It can also be used as an overlay material on cast iron. This alloy is especially useful for rebuilding chemical agitator beads, welding of stay bolts, salt water pipe lines, and similar parts that are exposed to extensive corrosive action.

EutecTrode 67 AC is a special flux-coated electrode for arc welding, and EutecTrode 670 DC is developed for DC arc welding. Both are available in sizes 3/16", 5/32", ⅛", and 3/32" diameter.

Saran-Lined Pipe and Fittings QB 332

The new Saran-lined steel pipe of the Dow Chemical Co. is designed to convey corrosive liquids, combining the desirable features of steel pipe—rigidity and pressure strength—with Saran's extreme resistance to chemicals.



Saran-lined steel pipe will satisfactorily carry corrosive sulphuric, hydrochloric, nitric and phosphoric acids. The working temperature of the pipe ranges from 0° to 190° F. depending upon service conditions.

Pipe in maximum lengths of 10 feet and 1"-4" in diameter will be manufactured. Fittings, also Saran-lined include elbows and tees, companion and reducing flanges and gaskets. The latter are made of specially compounded Saran to assure maximum chemical resistance at joints.

Field assembly presents no undue problems. Conventional power tools may be used for cutting and threading and assembly of joints is very similar to that of standard steel piping, the company reports.

Corrosion Resistant Diaphragm Type Valves QB 333

The Hills-McCanna Saunders patent valve, a diaphragm type, is now available from The Duriron Co., Inc., in the corrosion resisting alloys, Duriron and Durichlor.

The cast body of the valve is particularly resistant to sulfuric, nitric and acetic acids, being practically unaffected in any concentration and at any temperature. Durichlor is recommended for all concentrations of hydrochloric acid at temperatures below the boiling point.

The basic three unit construction—bonnet assembly, diaphragm and body—is the same in Durco valves as in all other Hills-McCanna Saunders Patent valves.

The moving parts of the bonnet assembly are loose fitting and free acting. There is no stuffing box or stem packing; the

The New Industrial Cartesian Manostat

Automatic • Sensitive
Positive • Economical

Based on a Principle Never Before Used for Automatic Pressure Control in Industry!

Working on the physical principle of the Cartesian Diver—a method new to industry—this new type Industrial Manostat is entirely automatic. No complex electrical or mechanical systems—no additional equipment of any kind is required for its efficient operation. You have only to put this new, completely self-contained unit in your system—SET IT AND FORGET IT.

Fulfilling the present pressing demand for a heavy duty, all metal unit, this unusually economical Industrial Manostat will maintain constant pressure or vacuum to within 1/10 of 1%.

The new Emil Greiner Industrial Manostat has all the advantages of our glass Manostat *plus* the following important features:

1—Larger Capacity
2—Wider Range (supplied with 3 interchangeable orifices)
3—Higher Sensitivity
4—Greater Flexibility
5—Control of both Pressure and Vacuum
6—Simplified Operation
7—Fool-Proof Design
8—Stainless and Chrome Steel
9—Low Price

For complete information, including performance and operating data, write for Bulletin ICM-96.

ACTUAL SIZE

Cartesian Manostat, Model No. 5 (Industrial), complete with 3 interchangeable orifices and mercury, $95.00.
Size: 7½" overall. Diameter: 3¼". Weight: approximately 6½ lbs.

To see our manostats in operation, you are invited to visit our Booths 226 and 228 at the Exposition of Chemical Industries, Grand Central Palace, New York City.

The EMIL GREINER Co.
161 SIXTH AVENUE NEW YORK 13, N. Y.

Branch Office: 112 BROADWAY, CAMBRIDGE, MASSACHUSETTS

Hard Working
PROTECTION

Hodgman Industrial Aprons
for Safety and Efficiency
in the Chemical Industries

No. 7100

Hodgman Protective Clothing is ruggedly constructed to provide maximum protection, comfort and long wear. Fabrics are coated in our own plant to make individual garments highly resistant to water, mud, acids, caustics, abrasives, greases, oils and other harmful agents.

No. 7072 is a black apron for general industrial use. No. 7162 is of same design and color but is especially made to resist fats, oils, greases and most solvents.

No. 7100 (above) is a strong black industrial apron which resists dilute acids and abrasion. Made of sheeting with both sides coated with synthetic rubber.

No. 7075 is a white apron for use in dairy, canning, packing and similar industries. No. 7096 is same as No. 7075 but especially treated to withstand greases and oils.

No. 7075

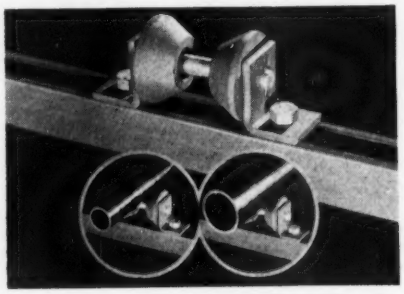
Send for complete information regarding these and other Hodgman Industrial Aprons.

HODGMAN
Rubber Company
FRAMINGHAM, MASS.

diaphragm completely isolates the bonnet parts from the fluids passing through the body. A tough molded diaphragm, available in many types of rubber and synthetic rubber materials, separates the body and the operating mechanism.

Roller Pipe Supports QB 334

In the new roller pipe supports of the Unistrut Products Co. the supporting



rings of the solid rollers have a slope of 30°. Their diameter is such that any size pipe from 1" to 12" in diameter can be supported on the same rollers, the only variation being in the length of the axles.

Temperature Resistant Steam Hose QB 335

In the improved "Burst-Proof" steam hose of The B. F. Goodrich Co., the principal improvement is that the tube and cover do not harden as much after prolonged exposure to steam at high pressures.

After exposures to steam pressures of 145 pounds and 225 pounds for prolonged periods, the tube and cover of the new hose showed more than 30% improvement in the amount of original elongation retained.

Pyrometer Controller QB 336

The new electronic pyrometer controller for heat control of furnaces, melting pots, and kilns of the Illinois Testing Laboratories, Inc., can be used for both production or laboratory operations. Pyrometer movement is double-pivoted on jewelled bearings; 6" mirrored scale is easy to read; case is dust-tight and weatherproof. Ruby "eye" indicates "on" and "off" conditions of heat supply.

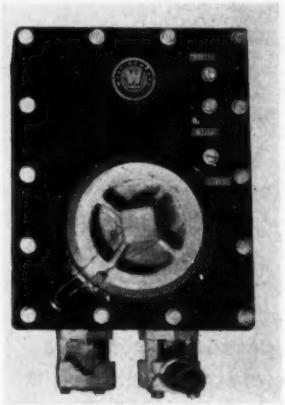
High Temperature Insulating Material QB 337

Owens-Corning Fiberglas Corp. has developed a line of light-weight high-temperature insulating materials, in felt and bulk form, which will withstand temperatures up to 1,800 degrees, F. In many other applications felts can provide a removable and replaceable insulation that can take the place of the refractories, up to now alone available for use in insulating such high-temperature equipment. They can also be employed as the filtering element in fly ash separators used in high-temperature processing equipment.

The weight of the felt form, in a thickness of 0.125-inch, is 0.047 pounds per square foot. Both forms remain flexible and dimensionally stable at the upper temperature limit, are unaffected by repeated heating and cooling, and by most acids, and are non-corrosive to metals with which they come in contact.

Explosion Tested Linestarter QB 338

A few improvements in the new explosion tested linestarter of the Westinghouse Electric Corp. are: rugged DC magnetic contactor with knife edge bearings; packing glands that can be bolted in place; a hand hole in the cover to facilitate replacing fuses or heaters; an overload relay that can be arranged for either manual or automatic resetting; and, a smaller enclosure. It is for use with DC motors up to 5 HP on circuits of



80, 115, 230 and 550 volts which may be safely started by connecting directly to the line.

These linestarters have passed all the tests of the U. S. Bureau of Mines for "Explosion Tested" equipment and may be used on "Permissible" machines when applied in accordance with Bureau of Mines regulations.

The contactor is equipped with magnetic blowouts that quickly rupture the arc and minimize burning of contact tips. A heavy spring provides quick break action. Overload protection is provided by an inverse time limit thermal overload relay that permits moderate overloads but acts instantaneously if load is sufficient to damage the motor. It can be had for either automatic or manual reset. Short circuit protection is provided by a fuse of such rating that it will not break the circuit on ordinary overload or the starting inrush current.

Nylon Filter Cloth QB 339

Nylon filter cloth is now available from Filter Media Corp. This cloth is substantially inert to the following:

Most common alkalies
Most organic acids

CHEMICO'S CREDENTIALS
for Designing and Building
HEAVY CHEMICAL PLANTS

Tray courtesy Georg Jensen

If you are contemplating the construction of an acid, synthetic ammonia, synthetic methanol or some other type of heavy chemical plant, examine well the credentials of those who would build it for you.

It takes skill and experience to properly analyze the requirements, select the right processes and equipment, design and erect the plant, train the operating crew. CHEMICO does all this . . . AND . . . backs it up with an iron-clad guarantee of plant performance.

CHEMICAL CONSTRUCTION CORPORATION

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European Technical Representative: Cyanamid Products, Ltd., Brettenham House, Lancaster Place, London W. C. 2, England
Cables: Chemiconst, New York

"Chemico plants are profitable investments"

CC-149

Halogenated hydrocarbons
Aldehydes
Ketones
Alcohols
Carbon Bisulphide
Carbon Tetrachloride
Trichlorethylene
Benzene

Nylon filter media have exceptionally high abrasion resistance, excellent heat resistance (melting point approximately 482° F.), are unaffected by fungi and micro-organisms, and have an extremely smooth surface which greatly facilitates cake discharge.

Nylon filter cloth is produced in twill, chain and plain weaves in numerous porosities and in widths from 26" to 72", This cloth can also be supplied in the form of made-up filter element covers with all sewing done with nylon thread.

Side Shifter for Pallet Trucks QB 340

Their new fork lift truck accessory, the Side Shifter, permits the operator to pick up or deposit a unit load in an exact location without repositioning the truck itself, according to Towmotor Corp. The new accessory provides lateral movement of a load, on forks or pallet, to either side and eliminates much truck maneuvering.

It is hydraulically operated and will move the carriage face and the forks a distance of 3½" in either direction. The accessory is designed to operate with standard Towmotor forks or Priester or Schmidgall forks.

Instrument Air Dryers QB 341

Dehydraire Corp. has developed a new line of instrument air dryers with a capacity of 12½ to 250 SCFM at 100 psi. and 70° F. which will dry the air for 25 to 500 air operated instrument installations.

Air leaving the Dehydraire will have a final dew point as low as —50°F. which is below any temperature recorded in this country, assuring absolute dryness regardless of weather conditions.

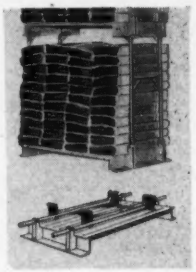
Units are available for either manual or automatic reversal on an 8 hour cycle. For hazardous locations all electrical equipment will be Class 1 Group D explosion-proof construction at a slight extra cost.

Wetting Agent for Fire Fighting QB 342

Pentrate is a new formula of the American-LaFrance-Foamite Corp. Inc. which, when added to water, reduces the surface tension, giving a solution with penetrating and spreading powers that make it much more effective in fire fighting. A concentration of less than 1% is required.

Pallet Stacker QB 343

Originated by the Elizabeth Iron Works, the "Multi-Stak Pallet Stacker Unit" consists of an all steel pallet and



a collapsible self-contained attachment for safe, easy, stacking of crushable or varying sizes of merchandise. When in use, supporting standards lock in an upright position to hold the "Multi-Stak" pallets, placed one above the other. No weight is placed on the merchandise itself.

PATTERSON-KELLEY
Heat Transfer EQUIPMENT
Stainless Steel
AS WE MAKE USE OF IT
★ KETTLES
★ HEAT EXCHANGERS
★ COOLERS
★ AUTOCLAVES
★ COOKERS
★ CONDENSERS
We have two experiences to offer in connection with your requirements along the above lines: (1) many years of experience in the design and construction of many types of heat transfer equipment; and (2) many years of experience in working with the stainless steels as used for such equipment.
Our engineers will be glad to work out the proper design of equipment to meet your requirements or help your engineering staff in any way if you prefer to do your own designing.
THE PATTERSON-KELLEY Company, Inc.
112 WARREN STREET, EAST STROUDSBURG, PA.
NEW YORK 17—101 Park Ave.
PHILADELPHIA 3—1700 Walnut St.
CHICAGO 4—Railway Exch. Bldg.
BOSTON 16—96-A Huntington Ave.
Representatives in Principal Cities

TIME
...measured in service and performance!

No one can say how long a time, measured in days, months or years, a certain valve will give satisfactory performance. Naturally it will depend on the service conditions—how much the valve is operated and especially the kind of media it controls.

But we can say positively that a valve of absolutely correct design and materials for the conditions under which it operates will last far longer and require much less maintenance than a valve which does not fully meet these requirements.

That's the kind of valves you get when you standardize on the Powell Line for all your flow control requirements. Because through more than a century of making valves—and valves only—Powell has concentrated on developing a complete line of valves—in bronze, iron, steel and the widest range of corrosion-resistant materials ever used in making valves—to meet every requirement of modern industry.

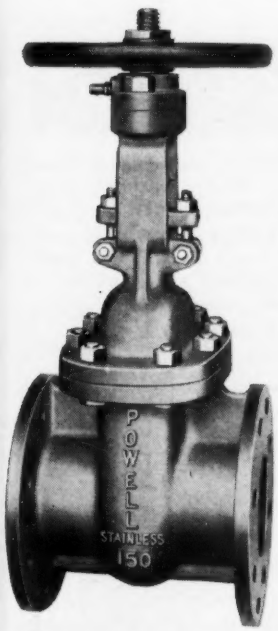


Fig. 2453-G—New, Standard 150-pound Stainless Steel Gate Valve with outside screw rising stem, bolted flanged yoke-bonnet and taper wedge solid disc.

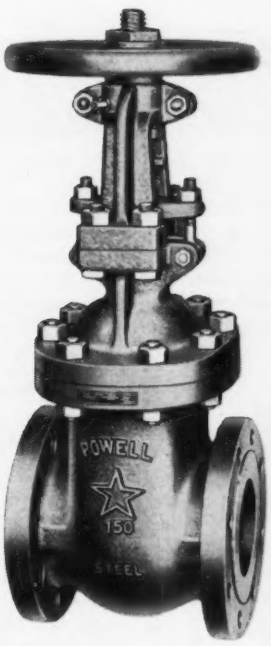


Fig. 375—200-pound Bronze Gate Valve. Screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel-bronze disc.

Fig. 1503—Class 150-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

Fig. 1793—Large 125-pound Iron Body Bronze Mounted Gate Valve. Made in sizes 2" to 30", incl. Has outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

When not in use, the supporting standards fold across the top of the pallet for compact storage in a minimum amount of space. The "Multi-Stak" pallet has a capacity of 4,000 pounds and is manufactured in several sizes, for bulk and heights.

Light Weight Portable Gravity Conveyor QB 344

A new light-weight aluminum gravity wheel-type conveyor has been designed by the Rapids Standard Co., Inc., to

provide a portable easy-to-handle type of conveyor for general use.

It will be manufactured in 5', 6', 8', and 10' lengths in one width of 12 inches. An eight foot section of the new conveyor weighs only 31½ pounds and may be handled with ease by either men or women workers. Tests indicate that an 8' section will stand a distributed load of 2570 pounds without failure.

Pyrometric Indicator QB 345

The Taco West Corp. have added a new series of precision electrical indicators to their line of automatic electronic control equipment.

The line includes the Veri-Tell Model "I"—A millivoltmeter pyrometric indicator thermally compensated, and including briquet (thermostatic) automatic cold junction correction.

The Veri-Tell Model "H" is a millivoltmeter pyrometric indicator in which the conventional briquet cold junction compensation is replaced with the newly developed Hypar compensator which derives its operative energy from a convenient line supply. A full 5" scale, anti-parallax mirror, and targeted knife edge pointer is standard.

Polyethylene Pipe and Fittings QB 346

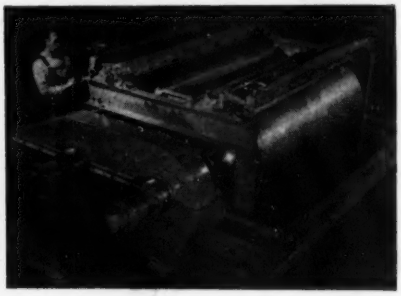
Polyethylene pipe and fittings, screw type, in sizes from ½" to 2" are soon to be available from American Hard Rubber Co. These new Ace products are insoluble in all common solvents at temperatures up to 50 to 60°C., with the exception of chlorinated solvents and aliphatic and aromatic hydrocarbons at elevated temperatures.

At normal temperatures the threaded fittings will withstand pressures up to 50 lb./sq. in. without leakage. In some cases they may be used at pressures as high as 100 to 150 lb./sq. in.

Gelatinizing Roll QB 347

A new gelatinizing roll has been designed for drying and processing starch products containing up to 45% moisture content by the Allis-Chalmers Mfg. Co.

A combination drying and flaking machine, the new roll can be fitted with a liquid feeder for drying 80% moisture material for production of dried milk, dried by-product of brewers yeast, dried distillers protein, baby foods and many



other high moisture content products requiring a drying and flaking operation.

The machine is designed for steam pressure up to 225 psig and is built for unusually high bearing pressures. A power range of 10 to 20 H.P.—depending upon speed and bearing pressure—is required to drive the 36" diameter and 84" long rolls, operating at a range from 5 to 20 rpm. Power is applied to the extended roll journal and is transmitted to the other

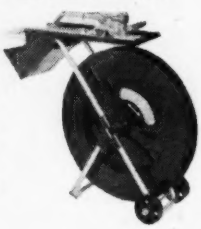
how to make Shipping Costs drop!

The big factor in running up shipping costs is damage to shipments in transit. Time, material and labor are lost. Packing materials are wasted. And, you run the risk of losing a good customer.

A few feet of *Signode Steel Strapping* on every shipping pack helps reduce shipping losses—and lowers costs. It adds strength and rigidity to the container, and increases resistance to internal and external pressures. May we send a trained Signode representative to tell you about Signode's System of Planned Protection?

SPEED STRAPPING OPERATIONS!

If you already are strapping your shipments, here is a portable strapping reel that speeds strapping operations. It can be moved anywhere. Ask for Signode Deluxe Model No. 9B.



SIGNODE

STEEL STRAPPING COMPANY

2662 North Western Avenue
Chicago 47, Illinois

Booth No. 2, 21st Chemical Exposition
Grand Central Palace, N.Y., Dec. 1-6, 1947

IF YOU want a powerful ally to help you knock corrosion out of your laboratory, pilot or production plant, here's what to do: step right up to Booth 2 at the 21st Exposition of Chemical Industries anytime between December 1 and 6. Meet General Ceramics Chemical Stoneware and Porcelain—the toughest, deadliest enemies of corrosion.

Absolute corrosion resistance to all chemicals except hydrofluoric acid, high mechanical strength, high resistance to thermal shock, easy to clean surface that will not craze or peel—these are the "weapons" that make General Ceramics Chemical Stoneware and Porcelain so mighty.

Because they are practical as well as powerful, General Ceramics Chemical Stoneware and Porcelain have found wide application wherever corrosive materials are conveyed or stored—for piping, vessels, pumps, exhausters, cocks, kettles, towers, sinks, tourills.

Let us tell you more. If you won't be at the Show, drop us a line for further information. Remember that General Ceramics will engineer the complete job including plant layout as well as equipment.

3682

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VANCOUVER, B.C.: Willard Equipment Ltd., 860 Beach Ave.

In addition to the manufacturing facilities of the Chemical Equipment Division those of the Insulator Division are also available for handling ceramic problems in all branches of industry. General Ceramics & Steatite Corporation is therefore able to offer service covering all industrial applications of ceramic products.

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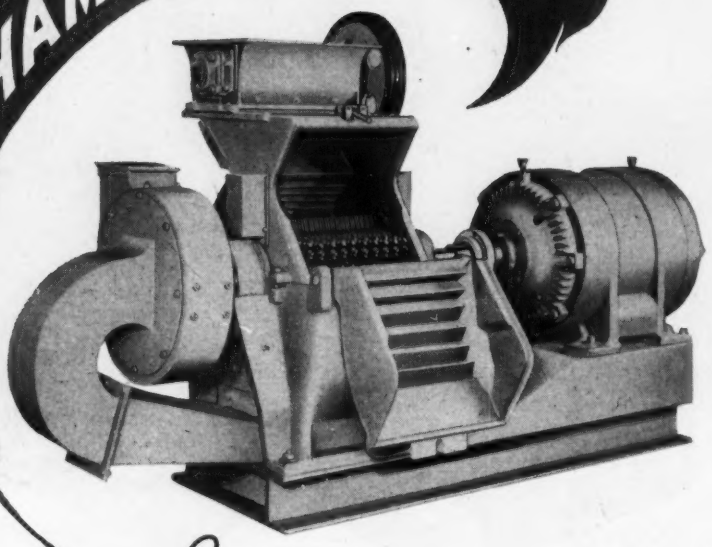
HAMMER MILLS



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★ MAXIMUM CAPACITY PER HORSEPOWER

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★ EXCEPTIONAL OPERATING ECONOMY

Ruggedly constructed and uniquely designed, Sprout-Waldron Hammer Mills offer outstanding efficiency on many processing applications. Exceptional operating economy is assured by the mill's overall simplicity.

Every square inch of blasting surface is fully utilized, realizing maximum capacity per horsepower. Sprout-Waldron and Company, Muncy, Pennsylvania.

SPROUT WALDRON
Manufacturing Engineers

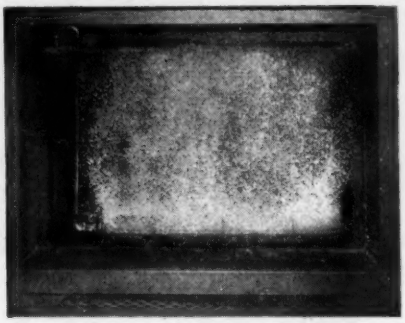
MUNCY PENNSYLVANIA

major roll through a roller chain drive.

Readily adjusted, the roll scrapers or doctor blades are easily removed for regrinding. The space between rolls is controlled by a pilot wheel or a ratchet wrench on each end of the movable roll with tension maintained by heavy coil springs. The roll shells are cast of special alloy metal that is said to have excellent wearing qualities and a high heat transfer coefficient.

Gas Diffusion Tube QB 348

A new gas diffusion tube, made of corrugated stainless steel and mechanically wound with Saran plastic cord, has been developed by the Chicago Pump Co. It



is reported to be 60% lighter than previous diffusion media.

Among the advantages claimed for the "Precision" tube are: Thin-wall construction (⅛th wall depth of previous tubes) reduces depth-clogging and provides for quicker and more effective cleaning; precise uniformity of fine-bubbled diffusion from entire active surface of the diffuser at all air-rates; lower head loss at all air-rates; greater surface area of tube diffusing at all rates . . . entire surface active at maximum rates; cleaned tubes restored to original performance, i.e., no progressive clogging.

Dry Chemical Fire Extinguisher QB 349

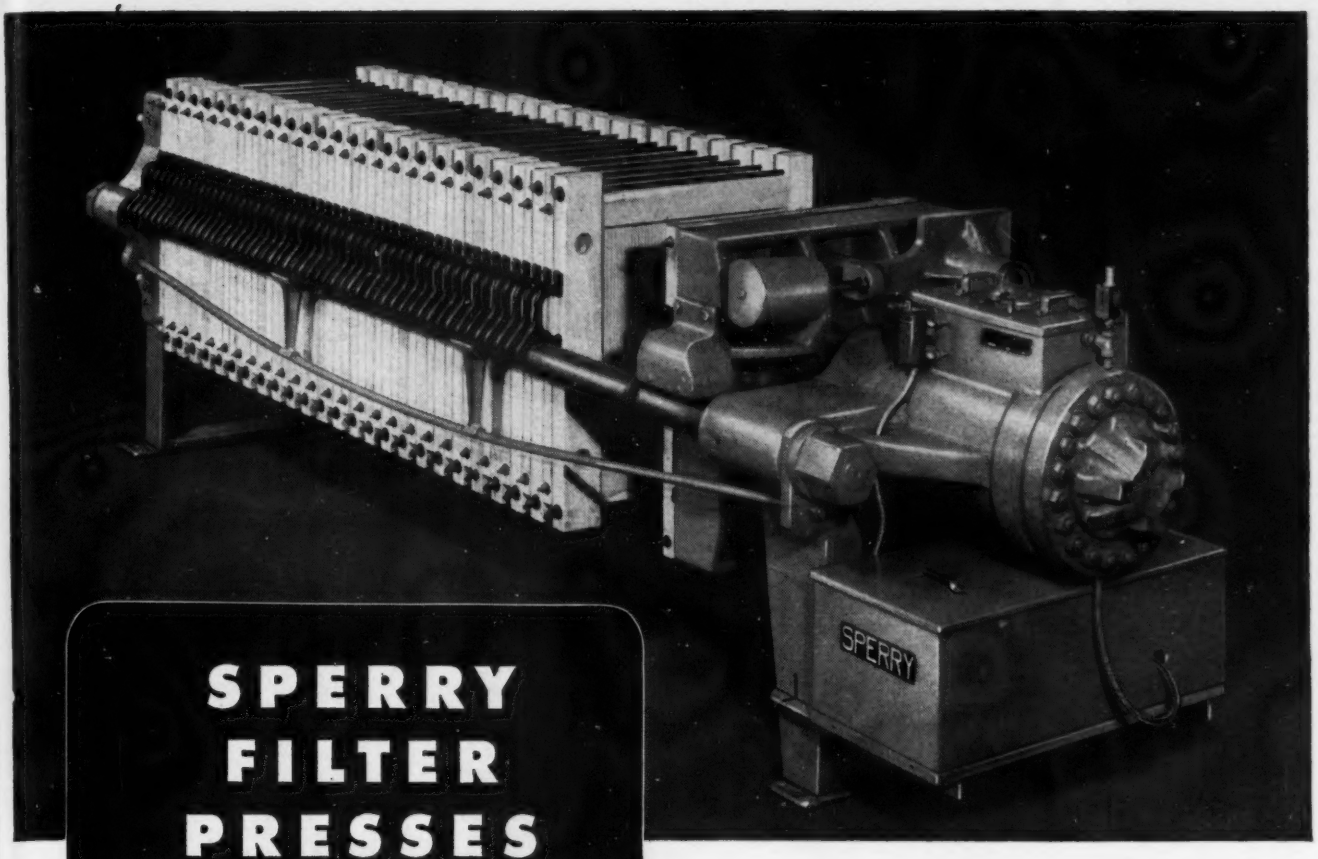
The new 4 pound model dry chemical fire extinguisher of the Ansul Chemical Co. is only 19⅛" long and 3½" in diameter.

The extinguishing agent used, Ansul Plus-Fifty dry chemical, is claimed to be non-toxic, non-corrosive, non-abrasive and a non-conductor of electricity.

The extinguisher can be quickly recharged on-the-spot after use and it is supplied with a quick-opening bracket for vertical or horizontal mounting in locations where space is limited.

Saturating Spray Air Conditioner QB 350

Identified as a saturating spray "Type A" machine, the new air conditioner of the Niagara Blower Co. operates on the principle of saturating air with moisture at a given desired dewpoint temperature



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FIRST FOR INDUSTRIAL FILTRATION

The ability to handle any filterable mixture . . . to handle it efficiently at lowest cost . . . is reason enough for the widespread popularity of the plate filter press. Chemical processors, brewers, pharmaceutical houses, paint and wax manufacturers, in fact virtually all industries employing the filtration process, have come to depend on the plate filter press.

These same industries, too, have come to depend on Sperry as the leading manufacturer of such equipment. Over fifty years of design and manufacture of filter presses have given Sperry the experience that means improved industrial filtration for Sperry customers.

The Sperry service includes not only the building of equipment, but laboratory research in all phases of the filtration problem as well. This research, together with the case histories in the Sperry files, is certain to lead the way to an efficient, economical solution to your problem. Why not call in a Sperry engineer today? Let him work with you just as he has worked with countless other industries.

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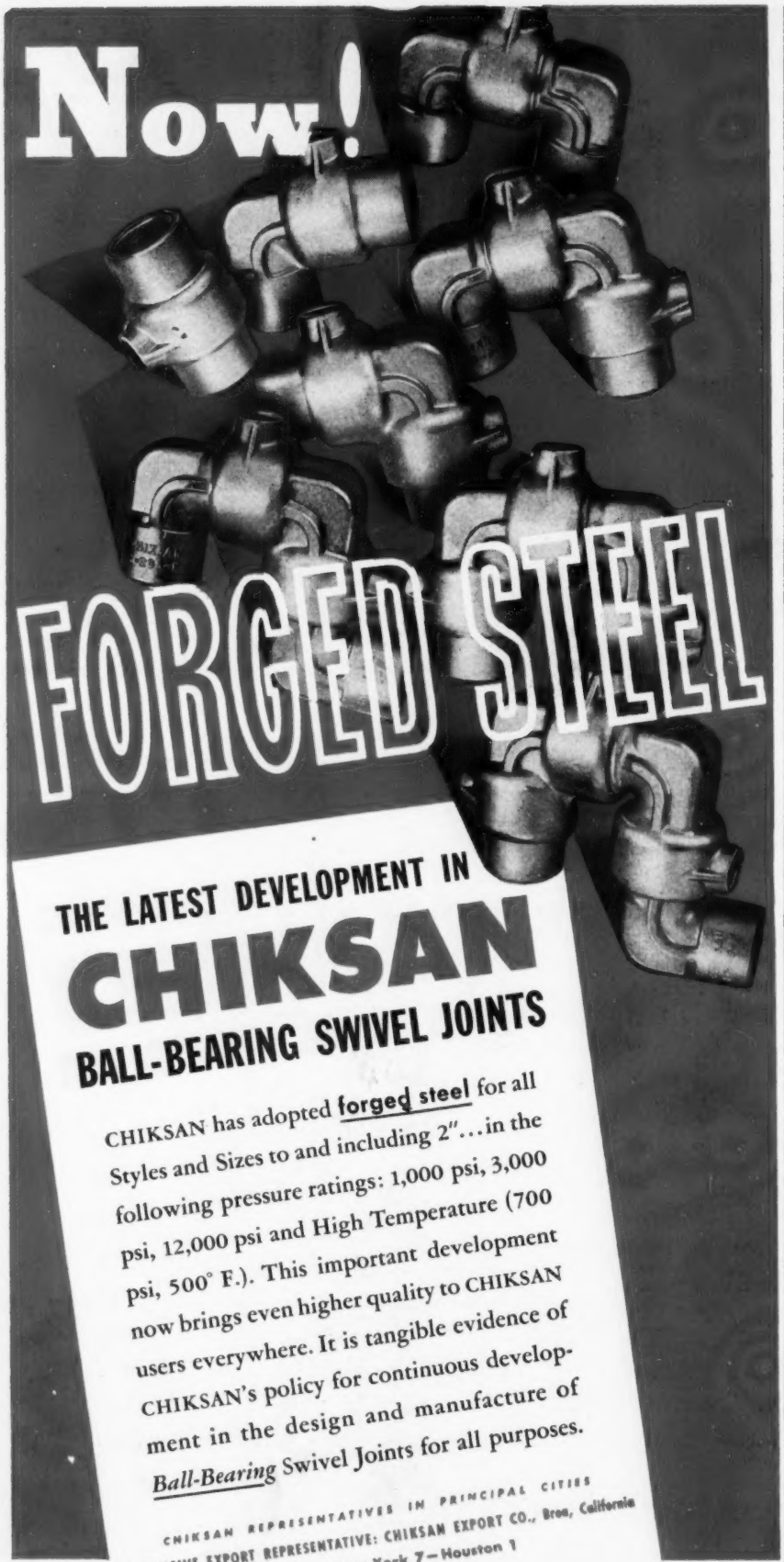

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BALL-BEARING SWIVEL JOINTS

CHIKSAN has adopted forged steel for all Styles and Sizes to and including 2"...in the following pressure ratings: 1,000 psi, 3,000 psi, 12,000 psi and High Temperature (700 psi, 500° F.). This important development now brings even higher quality to CHIKSAN users everywhere. It is tangible evidence of CHIKSAN's policy for continuous development in the design and manufacture of *Ball-Bearing* Swivel Joints for all purposes.

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BALL BEARING SWIVEL JOINTS FOR ALL PURPOSES

CHIKSAN COMPANY
BREA, CALIFORNIA
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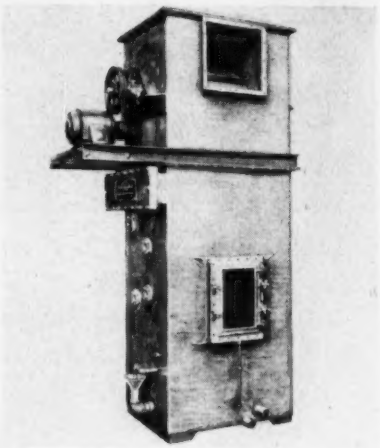
and then, by re-heating, producing the exact condition of relative humidity and temperature needed. The apparatus illustrated occupies 7½ sq. ft. and delivers

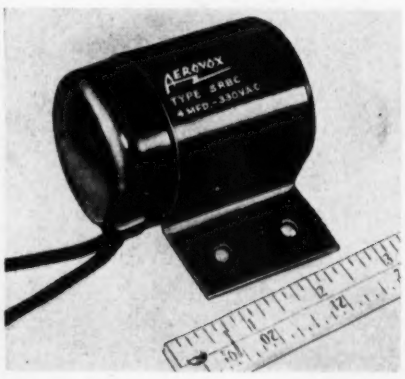


2,000 cubic feet of air per minute. Other models requiring up to 50 sq. ft. give air delivery up to approximately 20,000 cubic feet per minute.

Controls provide for holding or varying at will the conditions of relative humidity and temperature between 40°F. and 125°F. dewpoint temperature with extremely close tolerance. A dry bulb variation of 1°F. might mean a variation of 4% or 5% in relative humidity. Lower temperatures can be obtained by using Niagara "No Frost" liquid in the spray solution.

Motor Starting Capacitors QB 351

A new line of bracket-mounted, armored, space-saving motor-starting capacitors, Series SRVC, has been introduced by Aerovox Corp. Fully protected



against mechanical damage, dirt, and the usual climatic hazards, these new capacitors are distinguished by exceptional compactness. The sturdy steel casing measures only 2 1/16" in diameter by 2 7/8" to 3 3/4" long depending on voltage and capacitance ratings. Standard ratings are 110, 220, 330, 440 and 660 volts AC, while capacitances range from 1 to 8.5 mfd. The flexible pigtail leads from the encased capacitor are brought out through the insulated hole in the cap.

"A TANK CAR IN ITS TIME, PLAYS MANY PARTS"

What Shakespeare said of man is true of tank cars.

A fact not generally known is that certain types of tank cars—depending upon linings and other mechanical features—can carry a wide range of liquid commodities if properly and thoroughly serviced.

Rigid care in servicing is a specialty of General American. It enables the GATX traffic department to route cars by season . . . to change them from one commodity to another and from one section of the country to another.

The many rôles a tank car can play increase the value of the GATX fleet of more than 37,000 specialized tank cars of 207 types to General American's customers—the railroads and shippers.

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SARGENT-SLOMIN

Electrolytic Analyzers

FOR HIGH SPEED QUANTITATIVE ANALYSIS OF

- **Ferrous and non-ferrous metals and alloys.**
- **Electroplating solutions and electro-deposits.**
- **Ores and minerals.**
- **Metals in biological materials.**
- **Metals in foods, soils, etc.**
- **Forensic materials.**
- **Micro and semi-micro specimens.**

Designed for continuous trouble-free performance

The new Sargent-Slomin Electrolytic Analyzers represent a complete re-design of the original Slomin instruments. Each unit is mounted within a case consisting of a one-piece stainless steel panel, beaker platform and apron with sturdy end castings. All models are completely self-contained and operate from 50-60 cycle electric circuits—no auxiliary generators or rheostats are required.

The two position analyzers consist of two complete, independently operating analyzer circuits. Duplicate or check analyses can be run at the same time or two different analyses can be run simultaneously at different current densities.

The central electrode is rotated by a new synchronous capacitor wound motor, operating at 550 r.p.m., especially engineered for this application. Under development for five years, this motor has been thoroughly tested and approved for continuous operation. Fully enclosed for protection against corrosive fumes—the shaft, sleeve bearings, and cap are made of stainless steel.

Outstanding features of this rugged motor are:

Greater output than any motor of similar characteristics and size.

No internal switches or brushes.

No "permanent" magnets—full output for long service life.

Fully synchronous—no speed change with change of load.

All parts of the new electrode chucks are made of stainless steel. A simplified design utilizes a positive retaining spring which permits quick, easy insertion of the electrodes and maintains proper electrical contact.

These new analyzers used with the specially designed high efficiency corrugated electrodes rapidly produce smooth, close grained deposits at maximum current density.

S-29460 ELECTROLYTIC ANALYZER—Sargent-Slomin, One Position, with Heating Plate. For operation from 115 Volt, 50-60 cycle circuits..... **$250.00**

S-29465 ELECTROLYTIC ANALYZER—Sargent-Slomin, Two Position, with Heating Plate. For operation from 115 Volt, 50-60 cycle circuits..... **$395.00**

S-29632 ANODE—Platinum gauze, Corrugated Form, High Speed. (Patent pending.) Price subject to market.

S-29672 CATHODE — Platinum gauze, Corrugated Form, High Speed. (Patent pending.) Price subject to market.

E. H. SARGENT & COMPANY, 155-165 E. Superior St., Chicago 11, Ill.

Michigan Division: 1959 East Jefferson, Detroit 7, Michigan

S A R G E N T

SCIENTIFIC LABORATORY SUPPLIES

Temperature Regulator QB 352

Important features of the new self-acting, temperature regulator, Class "T", of the Leslie Co. include single seated construction in all sizes, ½"-4", for steam pressures up to 125 psi., packless main valve stem, hard faced seating surface and hardened wearing parts, liquid-filled thermostatic element, all of which assure positive control response to small temperature changes up to 450° F, positive dead-end shut-off, long life and simple maintenance.

● QB 353 Crane Co. has reinstated their line of **Ni-Resist cast iron gate valves**, which was discontinued prior to the war.

The valves are of the wedge disc, outside screw and yoke type and are being regularly furnished with screwed ends in sizes from ½"-2" and with flanged ends in sizes from 1"-8". All valves in sizes 3" and smaller have the clamp type bolted bonnet and sizes 4"-8" inclusive have the conventional type of bolted bonnet. Body and bonnet of all valves, the disc in sizes 4" and larger, and the gland in sizes 3" and smaller are made of Ni-Resist.

● QB 354 Built in four sizes for capacities to 1800 gph, the new model CDC **Decarbonator** has been added to the standard line of the Cochrane Corp. Water to the unit, controlled by a pilot-actuated regulating valve, is distributed over a packed tower. A motor-driven blower in a spool on top of the corrosion-resistant plastic-coated welded steel shell draws air up through the tower counterflow to the water thereby scrubbing the water free of carbon dioxide. A filter in the air inlet prevents contamination of the water with dust.

● QB 355 New design features in the Class DL and DLS **diaphragm regulating valves** of the Leslie Co. include: Single seated, tight closing main valves; hardened stainless steel valves, stems and guides, and integral hard surfaced seats; valve-above-seat position for reverse or direct acting valves; easy reversal of valve action by a simple change of diaphragm superstructure; "Conden-Seal" cooling bonnet which includes a stainless steel radiating tube and a condensate reservoir for steam service to protect the low friction packing gland at temperatures above 450 deg. F.; sensitive diaphragm assembly which maintains constant effective area throughout travel.

The Class DL is available in semi-steel (125 lb. flanges) or bronze body (300 lb. flanges); the Class DLS, in cast steel (600 lb. flanges). They are suitable for steam pressures up to 600 psi. and temperatures up to 800° F. and for pressure drop across the main valve as high as 300 psi. in the smaller sizes.

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Every-day a mountain of crystals is produced by Sharples Super-D-Hydrators used on the following and similar products:

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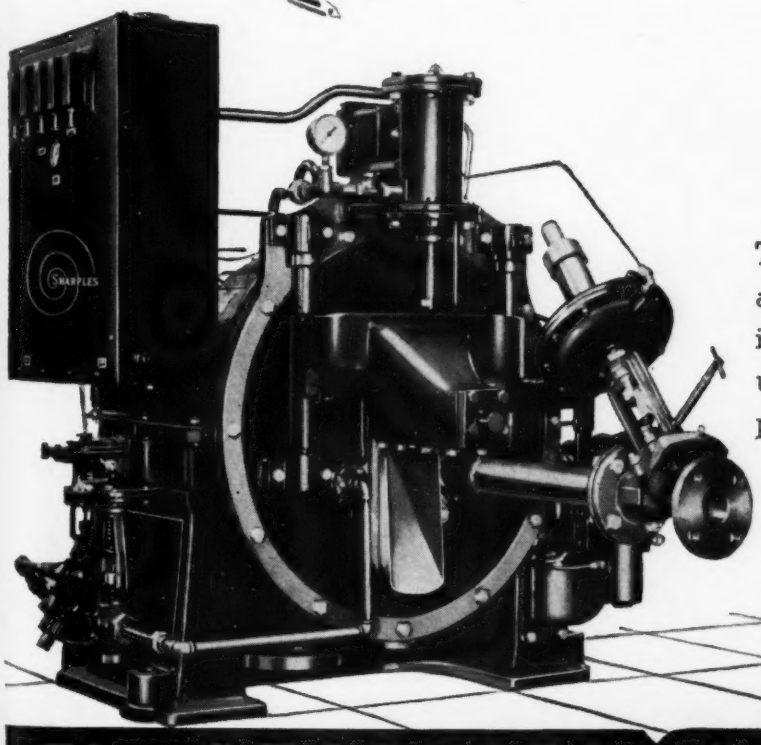

The Super-D-Hydrator is completely automatic in every respect. . . . Leading industrial and chemical plants use it to produce a more uniform product at a lesser cost.

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Cutting Transportation Damage

THERE HAS BEEN a continual increase in the damage of materials in transit, and even though all the agencies handling this problem are making every effort to devise ways and means of eliminating these damages, the amount continues to rise. This is serious to the shipper of chemicals; but in a great many cases the chemical manufacturer ships materials where damage is not only a monetary loss, but also a hazard to life.

A very worth-while article has been compiled in connection with damages in transit by the Research Institute of America, Inc., 292 Madison Ave., New York 17, New York, which is reprinted here in full*:

Cutting Damage in Transit

Now that first-class containers and packing materials are once more available, cost-minded shippers are attacking the damage-in-transit problem anew. Conditions during and after the war made a high rate of damage inevitable. There wasn't much you could do about heavy loading of freight cars, shortage of experienced labor and proper materials, careless unloading, restricted use of steel strapping, etc.

Today, these causes are diminishing but damage is still high. Wise companies aren't leaving the problem up to the carriers. Even when the carrier pays the claim, damaged shipments cost you time in investigating and settling, to say nothing of loss of reputation and good-will with your customers.

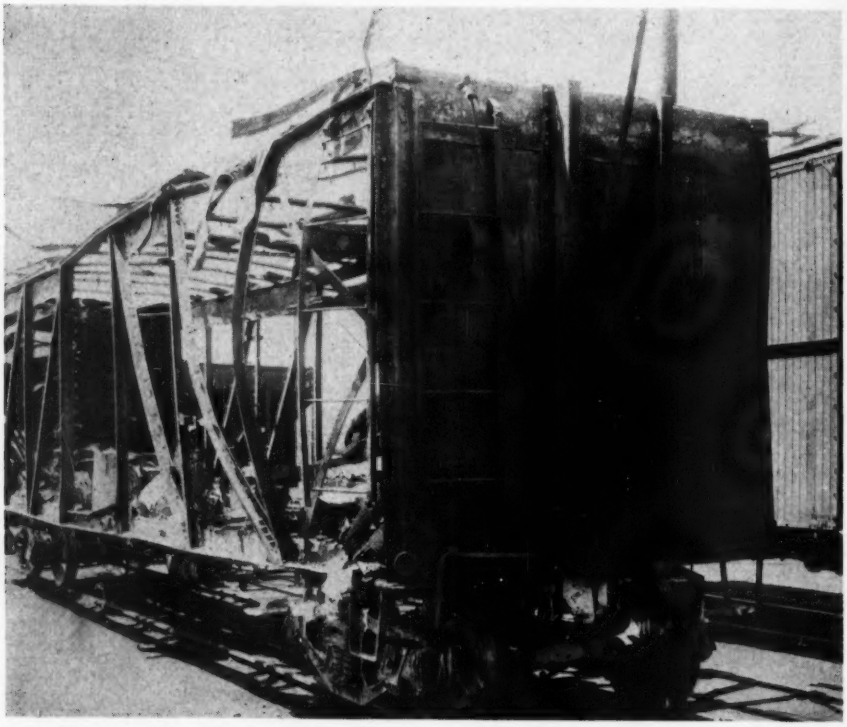
"Observation: The fact that *you* don't get complaints on shipments doesn't necessarily mean your packing job is 100% perfect. The railroads may be getting the complaints from your customers. (Railroads say that 95% of damage claims are filed by the consignee.) There are some cases where shippers never suspected poor packing, and even tried to cut down costs by using cheaper containers of lower strength values.

Watch These Danger Spots

Experience of the railroads and express companies shows a number of reasons for damage which are within the shipper's power to control. Here are the key points to check:

Recommendation: *Pre-test your shipping containers* if there is *any* doubt about

* Reprinted by permission of the Research Institute of America, Inc., 292 Madison Avenue, New York 17, New York, from the Operations Report of Executive Membership.



Improper packaging, neglect of precautions may result in damage, injuries, and loss of life.

CASE HISTORY NO. 19
One in a series of factual experiences telling how and why various American manufacturers use St. Regis Packaging System.

Here are the results this company got with a St. Regis Packaging System

1. Elimination of dust.
2. Economies in per-ton packaging cost.
3. Elimination of the nuisance of refilling used bags.
4. Increased packaging output per man-hour.
5. Better product protection.
6. Approval by customers.

Class of Product Packed

CEMENT	FERTILIZER
CHEMICALS	FOOD
FEEDSTUFFS	MISCELLANEOUS ✓

Product Characteristics

ABRASIVE ✓	GRANULAR
CORROSIVE	HEAVY ✓
DELIQUESCENT	HYGROSCOPIC
FLUFFY	LIGHT
FREE-FLOWING ✓	VISCOUS

St. Regis Packaging Systems are designed to meet a wide range of product requirements and plant layouts. Packers are available in a variety of sizes and types, with filling speeds as high as twenty-four 100-lb. bags per minute—with one operator. Nearly 400 commodities—rock products, fertilizers, chemicals, foods, and feeds—are now being packaged in sturdy, low-cost multiwall paper bags.

How mechanized bag filling took the dust out of old-fashioned methods at New Jersey Pulverizing Company

Up until fifteen years ago the New Jersey Pulverizing Company, Pinewald, N. J., was packaging its screened and pulverized sand products in the usual heavy, old-fashioned fabric bags. Not only were these bags expensive, but the packaging operation was slow and exceedingly dusty.

Today the company is using seven 100-GF and two 100-FL St. Regis valve bag filling machines and multiwall paper valve bags. Dust is reduced to a minimum, costs are cut, output is increased.

The company also finds that Multiwalls, whether in storage or in transit by freight car or by truck, keep their product dry and free from caking. This is important to many of the company's customers.

A. B. Schlesinger, president of the company, comments on the economy of his St. Regis Packaging System: "It cuts the initial investment in containers and reduces the per-ton packaging cost so that some of the present-day increased cost of labor and of plant operation is absorbed. Multiwalls have greatly speeded up our packaging. Moreover, we like Multiwalls because the nuisance of having old bags refilled is eliminated. Our customers appreciate the one-trip paper bag, too."

Says Benjamin Fisher, plant superintendent: "The St. Regis System solved our problem of dust in the packaging operation, and workers found paper bags easier to handle."

Mail the coupon for a detailed report, with pictures, of the New Jersey Pulverizing Company's use of St. Regis multiwall paper bags and bag filling machines. It may suggest how a St. Regis System can save money for you and give you better packaging.

At this plant filled bags are moved by hand-trucks directly to trucks or to box cars. Multiwalls protect the product against moisture-vapor penetration in transit and in storage.

One two-tube and one three-tube 100-FL St. Regis bag filling machines insure a high-speed, low-cost packaging operation.

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Strontium Hydrate	Barium Oxalate
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their strength. There are a number of standard methods used to test different resistance properties for various commodities. If you're not familiar with them, ask your trade association about what is being done in your industry. There are also a number of private laboratories which can do the work for you.

Observation: Carriers and industry associations are pushing to develop performance standards for shipping containers. These differ from standards based on materials specifications, in that *they measure the resistance of a container to the specific hazards it meets in transit.* Although some of the testing equipment is fairly expensive and requires trained operators, the drop table (which simulates rough handling) is one piece of apparatus that is simple and inexpensive. It is particularly handy for comparing the merits of inner packing materials, and for measuring closure efficiency. Some companies use it to spot-test claims made by container salesmen.

Recommendation: If you have a consistent damage record on any kind of shipment, it's often a good idea to call in a packaging expert. Causing of inadequate protection are numerous—faulty package design, poor containers or packing materials, wrong interior packing, unskilled use of filling materials and padding, improper closing, etc. Sometimes a change in product design is necessary.

Recommendation: Don't hesitate to ask the railroads or trucking companies for advice. They are more than glad to cooperate. (Loss and damage claims against the railroads last year rose to $95 million from $78 million in '45.) The Union Pacific has a container engineer whose sole job is to investigate container failures, analyze the causes and suggest corrective measures to the shippers.

Recommendation: *Follow a standardized marking and labeling system.* And require a double check on addresses before the shipment goes to the carrier. Obvious as this sounds, shipments still get lost because of poor marking. It is especially important on express shipments. Shipping room employees sometimes get careless and fail to remove old marks from re-used containers, or they use cheap ink or paint, or forget to enclose duplicate copies of invoices and addresses inside the package. Whatever system you use, be sure the marking is *permanent* and *easily readable*—and check on your shipping department *regularly* to make sure they don't ease off.

Recommendation: *Study new angles in carloading* if you experience damage from cargo shifting in transit. Most damage in carload shipments comes from unoccupied space resulting from inadequate blocking or compression of the lading. Failure of bracing or bulk-heading also causes trouble. Other common sources of damage are poor car-door blocking and failure to remove nails, wire,

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Made by expert workmen from quality cloth. Especially favored because of the high salvage value of these sturdy bags.

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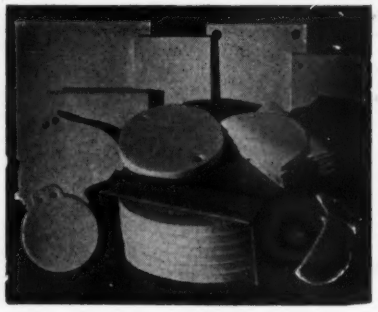

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103 Park Ave. New York 17, N. Y.

boards or strips from the car before loading.

Recommendation: Simplest way to avoid carloading errors is to train all workers concerned with preparing, handling and loading freight in the fundamentals. You can get a great deal of useful instructional material from the carriers. It's a good idea to have the relevant diagrams blown up by photostat or blue print and place them on the wall to serve as a constant reference for your personnel.

The shipper of goods, the transporter of goods, and the receiver of goods are apt to find themselves in strained relations which could be avoided if the shipper and transportation agencies were careful to see that inferior packaging is not used by the shipper, and inferior packaging not received by the transportation company. It is to the distinct advantage of both to give this matter the attention it deserves so that a reduction in damage claims may be possible.

Combination Spout-Closure For Metal Containers

A combination spout and closure for light gauge metal containers, developed by Rieke Metal Products Corp., Auburn, Ind., permits ample chime clearance and maximum drainage. This closure can be applied by the can manufacturer, or can be applied to either open or tight head containers by the filler after the contents are in the can.

Paper Study

In view of the increased use of multiwall paper bags for the shipment of dry and powdered chemicals, the following notice from the National Bureau of Standards, Washington 25, D. C., is of particular interest to all users of multiwall paper bags:

A comprehensive investigation of waterproofed papers—used for such purposes as packaging, curing of concrete, and moisture barriers in buildings—is being undertaken at the National Bureau of Standards through a fellowship of the Waterproof Paper Manufacturers Association. A long-range research program, extending over at least three years, has been jointly agreed upon. The services of Robert C. Reichel as research associate are being provided by the association, with laboratory facilities and technical assistance furnished by the Bureau. The papers to be studied comprise a wide variety of types of high-strength papers having high resistance to permeation by water and water vapor obtained by use of asphalt and other resistant materials.

Mr. Reichel, a graduate of the University of Illinois, was formerly research associate at the Bureau for the Insulation Board Institute. More recently he has been architectural field representative for

Seamless body, low pressure container by Crown Can

aerosol

Adaptable to all known types of valves. Can be loaded by "pressure" or "static" methods at high rates of speed. Proper internal coatings for various products. Container supplied in three or four color decoration... eliminating use of paper labels.

Crown offers you an efficient and economical container for pressure propelled products. This container embodies Crown's experience gained through the successful manufacture of hundreds of millions of drawn steel body containers to hold pressure.

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the Portland Cement Association, following war service in the Navy's Civil Engineer Corps. He is a member of the American Society of Civil Engineers and the Society of American Military Engineers.

The project for immediate investigation at the Bureau is the development of a suitable accelerated aging test for predicting permanence of the papers. This phase of the work will include new or improved tests for measuring changes in properties of the papers when exposed to deteriorating influences. The aging treatment will consist of exposure to cycles of extreme moisture and temperature conditions to which the papers may be subjected in use. The methods for determining extent of deterioration comprise tests for changes in strength, dimensions, and permeability to water and water vapor, and for ply separation. Other projects will include relation of properties of waterproofing asphalts to performance of the papers, means of reducing the flammability of the papers, and odor and taste problems involved in food packaging.

30-Gallon Aluminum Drum

A 30-gallon all-aluminum chemical drum developed by Reynolds Metals Co. was designed specifically for shipping hydrogen peroxide. While this chemical decomposes rapidly in the presence of heavy metal salts, high purity aluminum (99.6 per cent or more) does not affect it. The drum meets Interstate Commerce Commission Specifications 42D.

This drum, under most conditions, is also suitable for transporting and storing a wide range of other materials.

Container Truck

Since fiber drums are used most extensively in all phases of the chemical industry, the new American container truck, Model 56LP, developed by the American Pulley Co., 4200 Wissahickon Avenue, Philadelphia 29, Pa., is of interest.

Made of pressed-steel, nicely balanced, light in weight, it is an easy truck to handle. Because of unique design no nose prongs are required, thereby eliminating the danger heretofore caused by the noses of conventional trucks piercing or otherwise damaging the containers.

To use, the trucker simply approaches the container as closely as possible, adjusts a sliding hook to catch the chime around the top of the container and tilts to trucking position by pulling back on the handles while exerting pressure on the "Foot-Bar". The adjustable hook has a range of from 12" to 37½" in height, and is built strongly enough to suspend the container and hold it securely while in transit. To unload, one simply raises the truck handles, tilting container forward, whereby the container can be placed wherever the trucker wishes.

DRAUGHT OR PACKAGE:

Which is more profitable to the brewing industry?

The year was 1935.

Beer had just been successfully packaged in cans. The cans were trade-marked "Keglined."

And here was how the beer market split up at that time: *75% was sold and consumed in taverns; 25% was packaged for consumption in the home.*

Twelve years slipped by, while the country changed from a depression to defense preparation, to four years of successful war, and back to peacetime reconversion.

And here is how the beer market now splits up in the fall of 1947: *33% is draught and 67% is packaged for home consumption.*

To the brewer the interesting aspect of this change is that his package business is the more profitable end. It affords better brand identification. It is a trend that began with the introduction of that easy-to-take-home package, cans trade-marked "Keglined."

We wish we could claim that even half the home-beer business was in the package we invented. We can't. But we do maintain that our beer can encouraged the wholesome habit of drinking beer at home. Here's the reason we think so.

It's light to carry. You don't have to return it. It saves refrigerator space. It keeps beer at its best. It's easy to discard when empty.

So, it helped switch the brewer's sales from mostly draught to mostly "home" —the more profitable end of the beer business.

We think, therefore, you'll agree that people who do business with Canco profit. And we'd like the opportunity of bringing our packaging know-how to bear on your container problems. To increase your business. To increase your profit.

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Versatile chemical with many uses in paper manufacture, synthetic rubber, calico printing, pigments, tempering of steel, photographic bleach and toners, mild oxidizing agent, analytical chemistry, and blue print coating.

K_3 Fe $(CN)_6$

Mol. Wgt.	329.18
Ferrous Salts	trace
Sulphates	0.009%
Chlorides	0.020%
Assay	99.0%
Insolubles	trace

POTASSIUM METABISULPHITE

Granular $K_2S_2O_5$

Widely used as a preservative in beverages and foods, in photographic developers, dyeing and printing of textile fabrics, lithography and engraving preparations, and as a fine chemical reagent.

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Immediate shipments in commercial quantities.

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271 RUSSELL STREET, BROOKLYN 22, N. Y.

PRICING PRODUCTS

(*Continued from page 624*)

a sales price which would give a certain net return (after taxes) on the total rolled-up investment (see Table III):

TABLE III — ROLLED-UP INVESTMENT ITEMS

1. *Permanent Investment* (fixed assets)
   - Direct Production Unit
   - Allocated Share of
     - Services Investment
     - General Facilities (offices, shops, etc.)
2. *Working Capital*
   - Cash
   - Inventories of
     - Raw Materials
     - Material in Process
     - Finished Product
   - Accounts Receivable
   - Deferred Charges

This allows point E to be plotted. The distance B-E represents, of course, the return on both working capital and permanent investment. If working capital is a small portion of the total investment the decrease in working capital at less than capacity output can generally be neglected. Hence the dollar return required remains constant and the required sales dollars to net the given return can be plotted directly parallel to the cost of sales line (E-F). Where working capital is a large item it must be adjusted. This can be done in short-cut but usually adequate fashion by reducing working capital by the ratio of cost of sales at the two production extremes. In other words, take the proportion of the total return (B-E) which represents working capital and multiply it by the fraction D/B. Reduce the total return by the decrease found in this way and plot F'. The line E-F' then represents the required sales dollars for the given return.

The final work is then to draw in the lines for various sales prices as shown in Figure 2. From the intersections of these lines with the cost of sales line (B-D) and the cost-plus-return line (E-F or E-F') it becames straightforward to construct a curve of the type of Fig. 3, showing the return which may be expected at different rates of operation and different sales prices. This is the usual method of presenting the data to management.

The methods outlined above for showing variation of cost and cost-plus-return with plant size and percent of capacity operated admittedly contain many shortcuts. Experience has led the writer to believe that the assumptions are well within the accuracy of the basic data. Their virtue lies in affording a rapid means of presenting management with data it needs.

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1. Williams, R., "Standardizing Cost Data on Process Equipment," Chemical Engineering, June 1947, Pages 102-103.
2. Bullinger, C. E., "Engineering Economic Analysis," McGraw-Hill Book Co., New York, 1942, pages 142-147 and 217-239.

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EXPERT LITHOGRAPHERS OF METAL CANS SINCE 1901

PLANT OPERATIONS NOTEBOOK

Clay Vent Cap

More than $10,000,000 is lost to industry each year because of lightning. One of the more recent protective measures is the clay vent cap designed by the

Robinson Clay Products Co. of Akron, Ohio, to stick over any bare vent or stack. Clay is a non-conductor and discourages attack by lightning. Because of the resistance of clay to acid fumes it is particularly adapted to use in chemical plants.

Safety Stickers

Self sticking safety stickers are being made by the Howard Company, 15811 Denker Avenue, Gardena, Cal., to remind a workman of specific hazards — just when he is about to start a job in a way that is not safe.

These inexpensive reminders, known as Safe-T-Stikrs, are 2" by 4",

and worded like a miniature billboard to demand attention and insure reading. Self-sticking, they are easy to press in place where they catch a man's eye just as he starts a hazardous job; easy to peel off clean and replace with fresh reminders to keep their "new sign" effect.

Carbon Tetrachloride

The characteristics and hazards of carbon tetrachloride in industrial uses are described in No. 9 of the Controlling Chemical Hazards Series, just issued by the Division of Labor Standards.

The use of carbon tetrachloride is relatively safe when under efficient engineering control, according to the pamphlet, but the inhalation of vapor and prolonged or repeated contact of the liquid with the skin or mucous membranes should be avoided.

Safe handling methods are described and recommendations are made in regard to engineering controls, ventilation, employee education and training, protective equipment and safe practices.

The information in this pamphlet should be of especial interest where carbon tetrachloride is used, as in filling fire extinguishers, manufacturing synthetic rubber, degreasing and dry-cleaning occupations, and many agricultural operations.

A limited number of copies of this pamphlet may be obtained from the Division of Labor Standards as long as the free supply lasts. Copies may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 10 cents each.

NOMOGRAPH-OF-THE-MONTH Edited by DALE S. DAVIS

Determination of Allowable Vapor Loads in Tray Towers

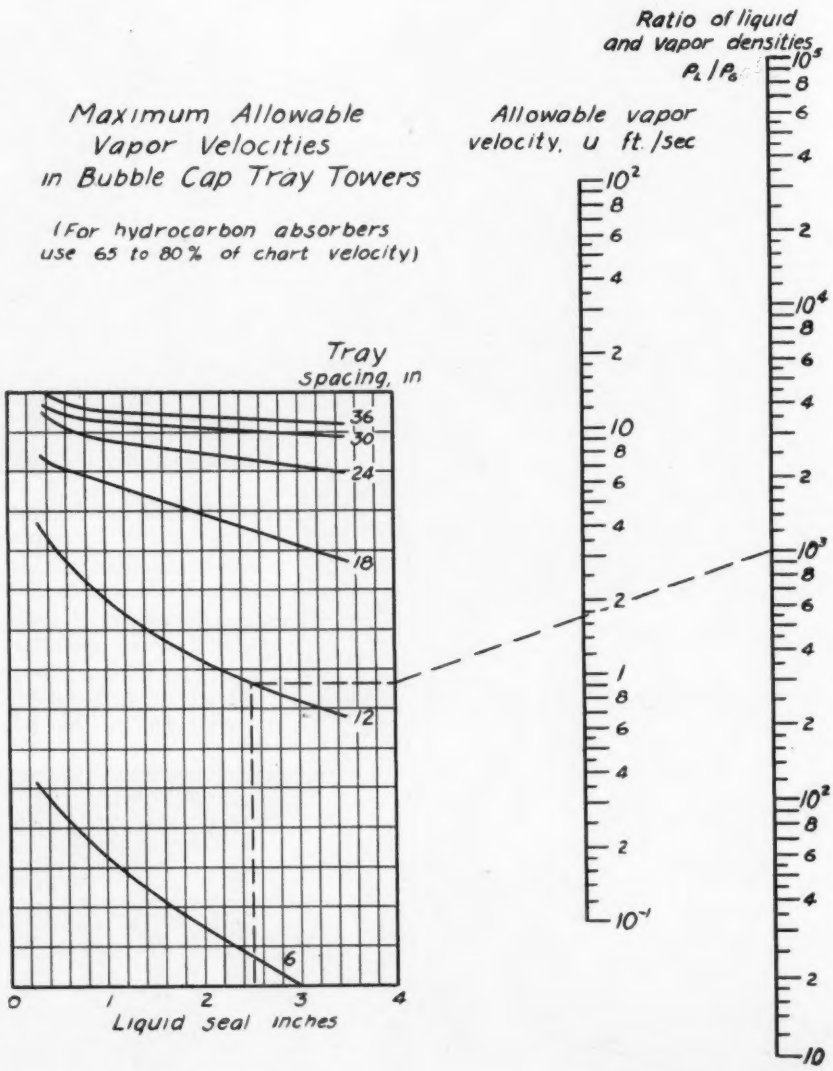
by S. M. WALAS
Boston, Massachusetts

CHEMICAL INDUSTRIES *will be happy to receive any charts which you may have developed so that they may be shared with your fellow engineers. The authors of each chart published will receive an honorarium of $10.*

THE allowable vapor velocity in bubble cap tray towers is commonly calculated by means of the equation

$$u = K\sqrt{\rho_L/\rho_G - 1}$$

where u is the vapor velocity in feet per second, ρ_L and ρ_G are the liquid and vapor densities, respectively, at the tower conditions and K is a function of the tray spacing and the depth of clear liquid



THE LATEST DEVELOPMENT in ORGANIC ACID EXTRACT from REDWOOD BARK

Sodium PALCONATE

(Trade Mark)

Now available for laboratory and quantitative test is the new sodium salt of complex organic acid, SODIUM PALCONATE, derived from the bark of California Giant Redwoods.

- Added to water, SODIUM PALCONATE appreciably lowers surface tension.
- As a concentrated aqueous solution it becomes gel-like in structure.
- In an aqueous state SODIUM PALCONATE is effective in removing zinc and aluminum ions from solution.
- Insoluble in organic solvents, SODIUM PALCONATE is highly soluble in water, and only somewhat soluble in 50% water-alcohol solution.
- It is mildly antiseptic to such organisms as Aerobacter aerogenes and Bacillus mycoides.
- SODIUM PALCONATE is easily converted to the free acids by passage of dilute solution through cation exchange column.
- The resultant free acids are more soluble than SODIUM PALCONATE in organic solvents, and less soluble in aqueous solvents.
- The empirical composition of the free acids is:

  Carbon 57.1% Hydrogen 5.0% Oxygen 34.0%
  Neutralization equivalent (conductometrically)—approx. 140
  Contains aliphatic hydroxyls, phenolic hydroxyls and carboxyls in ratio of 2 : 4 : 3.
  Minimum molecular weight exceeds 900.

A Few Suggested Uses

1. For controlling viscosity of oil well drilling muds.
2. For certain types of flotation operations.
3. Replaces tannin in many applications.

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INDRAWET is multi-functional. As wetting agent, penetrant, detergent, foaming agent and surface-tension depressant, it is used in:

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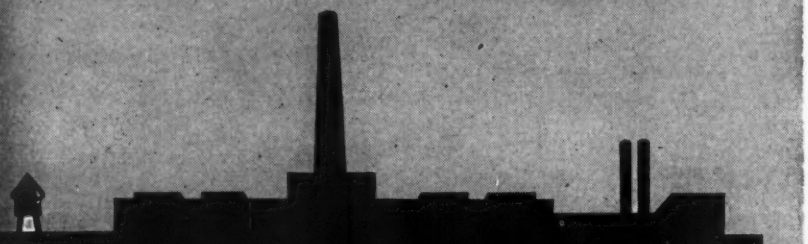

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See Sweets Files, Chemical Engineering Catalog, Refinery Catalog, etc.

which is above the top of the cap slots.

Values of K, given by Carey (1) and by Perry (3) conform to conservative practice in petroleum and hydrocarbon distillation. For hydrocarbon absorbers, 65-80% of these values are employed.

Carey's data have been plotted and combined with a scale for the density ratio to provide a convenient chart for determining allowable vapor loads. The broken line on the nomograph, constructed by methods previously described (2) shows that for a fractionator with a tray spacing of 12 inches, a liquid seal of 2.5 inches and a density ratio of 1000 the vapor velocity is 1.7 feet per second.

Literature Cited

1. *Carey, J. S., Chem. Met. Eng., 46, 314 (1939).*
2. *Davis, D. S., 'Empirical Equations and Nomography', Chap. V, New York, McGraw-Hill Book Co., 1943.*
3. *Perry, J. H., 'Chemical Engineers' Handbook', 2nd ed., p. 1450, New York, McGraw-Hill Book Co., 1941.*

American Standards

An entirely new listing of its 874 standards is now available, free of charge at the American Standards, Assoc., 70 E. 45th St., New York 17, N. Y.

Under the new price listing a complete set of all American Standards comes to $200.00 and a complete set of all American Safety Standards costs $32.50 per set.

Ventilating Equipment

Ventilating equipment provides basic protection from health and fire hazards in the solvent department, and should be inspected regularly. To eliminate the five most common causes of failure of ventilating equipment, the following points should be checked:

Is the fan running backwards? Strangely enough, this is the most frequent reason for failure of correctly designed equipment. Sometimes a fan requires repairs, and is reversed when started up again.

Is the fan belt loose? Loose belts cause the fan to run too slowly. Since new belts generally loosen up somewhat after use, they should be adjusted after installation.

Is the system overloaded? While a system may be correctly designed for the initial load, it often happens that additional outlets are later added, reducing the overall efficiency of the equipment. The velocity of the air stream should be measured regularly, and whenever additional ducts are added.

Are the ducts and blades dirty? Dirt in a ventilating system is a frequent cause of breakdown and inefficient operation. Systems should be cleaned regularly. Fans should be run for a few minutes after operations are finished, to allow for complete emptying of the ducts.

Is there insufficient make-up air? Since ventilating equipment exhausts air, it cannot run efficiently unless there is provision made for enough make-up air to enter the room.

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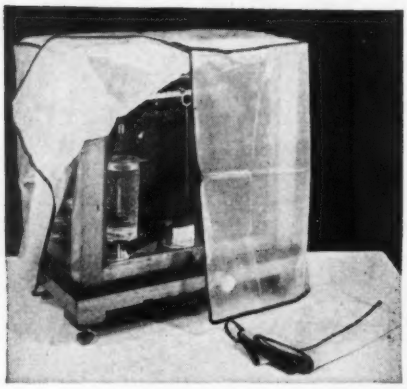
LABORATORY EQUIPMENT

INSTRUMENT COVERS



Transparent plastic covers for laboratory equipment afford protection against dust, dirt, and spilled liquids, while permitting observation of the covered instrument.

Made of semi-transparent, flexible, non-hardening material, these covers are machine sewn with black basting. Standard covers for ph meters, scales, and balances are in stock; special covers in any size can be supplied promptly.

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C-853	Balance, 18 x 10 x 17 H	ea. 3.00
C-854	Balance, 18 x 10 x 21 H	ea. 3.00
C-860	Macbeth ph Meter	ea. 1.00
C-862	Beckman ph Meter "M"	ea. 1.10
C-864	Beckman ph Meter "G"	ea. 1.00
C-866	Coleman ph Meter	ea. 1.00
C-871	Harvard Scales	ea. 1.50

Prices on other standard equipment on request.

BALANCE ILLUMINATOR

B-918

Balance Illuminator in electro-polished Stainless Steel case. Has 14 inch fluorescent tube, producing cool, glareless light. Rests directly on top of Balance and gives a concentration of light, illuminating beam, index plate, and pointer. Overall width is 16 inches. Supplied complete with tube, switch, cord and plug, for use on 110 volt 50-60 cycle A. C. only. Each $16.50

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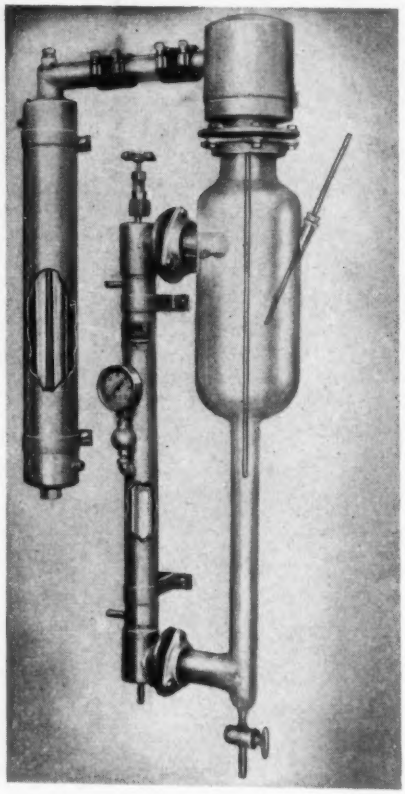
LABORATORY NOTEBOOK

Larger Laboratory Evaporator

Used for concentrating solutions, the "Precision" laboratory evaporator bridges the gap between pilot plant and small laboratory apparatus. It is constructed on the same general principles as large industrial units—and eliminates the necessity of using the outmoded steam cone and round bottom flash as basic equipment.



This evaporator may be used on sugar syrup solutions and corn products, for concentrating fruit juices, for removing solvent from aqueous or alcoholic solutions, for studying agricultural residues of wheat and similar products, and on gelatin liquors. One of the latest applications is in the pharmaceutical field.

All parts of the evaporator are constructed of Pyrex glass or 18.8 stainless steel (type 304). The glass body is made in one piece. The steam chest will stand pressures up to 150 p.s.i. Vacuum is created by a water ejector or a vacuum pump. The entire unit, net weight 50 lbs., is self-contained and can be mounted on a wall with integral brackets.

Evaporation is rapid; the equipment handles batch volumes up to 3 liters; 12 liters of water per hour (26.4 lbs.) can be evaporated. After evaporation, the concentrated solution is drawn off through the drain cock at the bottom of the glass body. The evaporator can be modified for continuous feed. It is available from precision scientific Co., 3737 W. Cortland St., Chicago, Ill.

Ultramicroburet

Small drops of liquid can be measured by a delicate new instrument, called the ultramicroburet, which should prove invaluable for measuring infinitesimal amounts of liquid used in microanalysis, according to Emil Greiner Co.

A piston tipped with a carefully fitted washer expels the liquid from the end of a narrow tube, and the distance the piston travels is recorded on a sensitive micrometer dial. Since the cross-section area of the tube is known, it is simple to calculate the volume of liquid expelled.

The ultimate lower limit of measurement of this type of instrument is extreme. A cylindrical rod, or more strictly speaking, a stiff wire, of 0.1 mm. diameter as a piston in combination with a dial micrometer gage reading in units of 0.001 mm., will detect as little as 1×10^{-8} cc. of liquid.

Calorimeter Measures Heat of Gases

A new flow calorimeter for more accurate measurements of the specific heats of gases has been developed at the National Bureau of Standards. The precision of the new instrument is chiefly due to the almost complete elimination of heat leaks by various features of design. The small heat capacity of the calorimeter also results in improved accuracy through the easier and more rapid attainment of a constant temperature distribution within the system, since only under conditions of steady temperature is an accurate measurement possible.

Accurate data on specific heats and other thermal properties of gases are of value to chemical industry, where they are used in calculations that predict the results of chemical reactions. With sufficient knowledge of the thermodynamic properties of the compounds involved, it is possible to state the range of temperature within which a given reaction will occur and to estimate closely the relative amounts of the products.

The entire calorimeter is immersed in a constant-temperature bath. The gas whose specific heat is to be measured enters the system through a copper helix, in which it is brought to the temperature of the bath. It then flows into the calorimeter proper, where it traverses a labyrinth surrounding a Constantan heater,

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STANDARD INSTRUMENT
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Fisher

ELECTROPHOTOMETER

Fisher Electrophotometer, complete with built-in galvanometer, three standard filters, three 23-ml. absorption cells, manual containing typical procedures and step-by-step directions, for use with 110 volts, 50-60 cycle A.C. only, **$210.00**

The Fisher Electrophotometer permits colorimetric analyses to be made accurately, quickly and simply wherever the color of the solution varies in a definite manner with the concentration of a constituent. Because of its unique, valuable features, the Electrophotometer is now widely employed for conducting many essential routine analyses and for research.

The Electrophotometer operates from any 110 volt, 50-60 cycle line. With it, the user can detect very slight color intensity differences because the photoelectric system it employs is considerably more sensitive and reliable than the human eye. Once a calibration is made, subsequent analyses can be conducted as rapidly as the simple operations can be performed.

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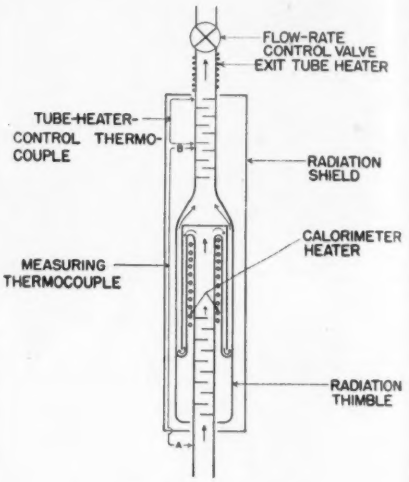
and leaves the calorimeter through a throttle valve. The temperature rises within the calorimeter is determined by appropriately located thermocouple junctions.

A uniform rate of gas flow is obtained by maintaining a constant pressure on the inlet side of the calorimeter and a constant lower pressure at the outlet. Adjustment of the throttle valve in the outlet tube then provides the desired rate



of flow, which is determined by weighing the gas collected in a condensing reservoir within a given time.

The accuracy of the apparatus has been checked by measuring the specific heat of oxygen, which had previously been accurately calculated from the latest spectroscopic data for this gas. The experimental values obtained at —30°, 40°, and 90° C. differed from the spectroscopic values by 0.06, 0.00, and 0.10 per cent, respectively. From a consideration of the data for oxygen, the probable error of the specific heats obtained with this calorimeter is estimated as 0.07 per cent.

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Rare Earths

THE RARE EARTH ELEMENTS AND THEIR COMPOUNDS, by *Don M. Yost, Horace Russell Jr. and Clifford S. Garner.* John Wiley and Sons, Inc., New York, 1947. viii + 92 pp. $2.50. Reviewed by Edwin M. Larsen, Assistant Professor of Chemistry, University of Wisconsin.

THIS BOOK presents the most up-to-date, systematic and concise survey of the rare earths available to students of the less familiar elements. In the authors' words, "The purpose of the present monograph is to present the principal chemical and physical properties of the rare-earth elements and their compounds and to exhibit the concordance of the current theories with these properties." Although the authors assume that the reader is well versed in modern physics and physical chemistry as shown by the discussions on electronic structure, paramagnetic properties, and absorption spectra, the descriptive data on the properties, methods of separation, and preparation of the elements and their compounds are presented in such a manner that a less specialized reader can obtain a unified picture of the subject. In additional sections, evidence for the existence of element 61, and the nuclear properties of the rare-earth elements are considered.

The text is well documented with "key" references which have been critically appraised so as to give the textual material a note of authority, and it is also supplemented with appropriate tables of data and figures. It is regretted that the quality of the paper used does not equal the quality of the manuscript.

Organic Compounds

CHARACTERIZATION OF ORGANIC COMPOUNDS, by *F. Wild.* Cambridge at the University Press; New York, The Macmillan Company, 1947, 306 pages, $3.75. Reviewed by M. G. Sturrock, Dominion Tar and Chemical Co., Ltd.

THE AUTHOR'S preface to this little volume clearly states the function which it is designed to perform. He rightly wishes to indicate to the student the difference between the classification of an organic compound and its identification. He then proceeds to summarize the methods by which the latter may be finally achieved. The first two chapters dealing with physical methods of manipulation are manifestly intended for student consumption. From this standpoint the book should appeal to teachers in the field of organic chemistry. It is to the industrial research worker, however, that the book will prove to be of practical value. The presentation of the details of the preparation and use of reagent solutions, which is an indispensable feature of any book purporting to contribute in this field, is well done and will serve as a valuable time-saver. An adequate number of references to more precise information complements the detailed instructions. The author shows commendable judgment in clearly indicating, wherever possible, the limits of the various methods.

It may be said quite generally of the books which have been published on the subject of classification and identification of organic compounds, that the use of fractional distillation in organic analysis is either treated lightly or depreciated. The volume under discussion is no exception and it may be quite fairly criticized in this respect. It is surprising that micro fractional distillation is so grossly neglected. Possibly it is because of the low degree with which distillation is regarded in this connection that some of the boiling point data have not been revised in accordance with the results of the latest and most accurate determinations.

The writer has found a great deal of useful information condensed into a minimum of space, nicely arranged and indexed. The book, at its modest cost will be of particular interest to students. It merits a place on the shelves of a research library.

Russian Dictionary

RUSSIAN - ENGLISH TECHNICAL AND CHEMICAL DICTIONARY by *Ludmilla Ignatiev Callaham.* John Wiley and Sons New York 1947, 794 pp., $10,00. Reviewed by John Turkevich, Princeton University.

EXAMINATION of the current issues of the Chemical Abstracts indicates plainly the rising volume and quality of chemical research and publications in the Soviet Union. This rapid rise presents to us in the United States a problem of finding an efficient way of reading the Soviet literature. The chemists of this country have been living up to their reputation of an alert professional group and have organized in many places classes in scientific Russian. They have found in the alphabet no stumbling block and came to the realization that the Russian language though difficult, is at least translatable, provided one can obtain a good dictionary. Mrs. Callaham's dictionary is excellent.

"Inorganic and organic chemistry, chemical technology, and chemical engineering are naturally given complete coverage. Mineralogy, metallurgy, mining and geology, general engineering, pharmacy and botany are also comprehensibly covered. In addition, the more frequently used terms in aeronautics, radio technology, meteorology, agriculture, medicine, physics, mathematics and other pure sciences are included. . . . it includes a general vocabulary consisting of all words that might appear in technical articles."

With this dictionary and experience any Russian chemical article can be translated provided one has sufficient patience.

Acids and Bases

THE ELECTRONIC THEORY OF ACIDS AND BASES, by *W. F. Luder and Saverio Zuffanti.* John Wiley & Sons, Inc., New York, 1946; 165 pp., $3.00. Reviewed by Donald P. Graham, Jackson Laboratory, E. I. du Pont de Nemours and Company, Inc.

THIS BOOK provides a systematic but elementary presentation of the relationship of the Lewis theory of acids and bases to chemistry as a whole. This theory defines acids and bases as acceptors and donors respectively, of electron pairs, to form coordinate covalent bonds. It is shown to include the proton and solvent theories as special cases and to facilitate the classification of chemical reactions in three groups:

(1) Acid—base reactions (Coordinate covalent bonds formed).

(2) Oxidation — reduction (Electron pairs transferred).

(3) Odd molecule reactions (Covalent bonds formed). Emphasis is placed upon the relative nature of acidic or basic character as determined by the reactions in which substances take part rather than solely by the structure of the substances themselves. Thus, hydrogen chloride acts as a base in its formation of addition compounds with sulfur trioxide or stannic chloride.

The first four chapters of the book comprise a historical introduction and general exposition of the theory. The next seven offer examples in terms of the four experimental criteria proposed by Lewis; neutralization, titration with indicators, displacement, and catalysis. Four chapters are devoted to the last topic. A concise summary and restatement of the argument is provided in a final chapter.

The development of the thesis is clear, and well documented. It is skillfully oriented with respect to earlier theories. However, integration with modern theoretical advances is less complete. The role of electron density distribution is considered, but little or no mention is

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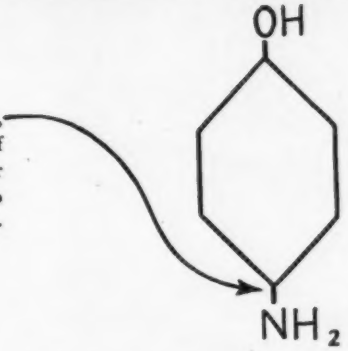

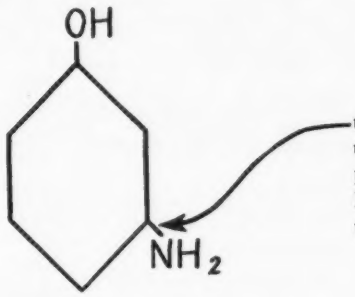

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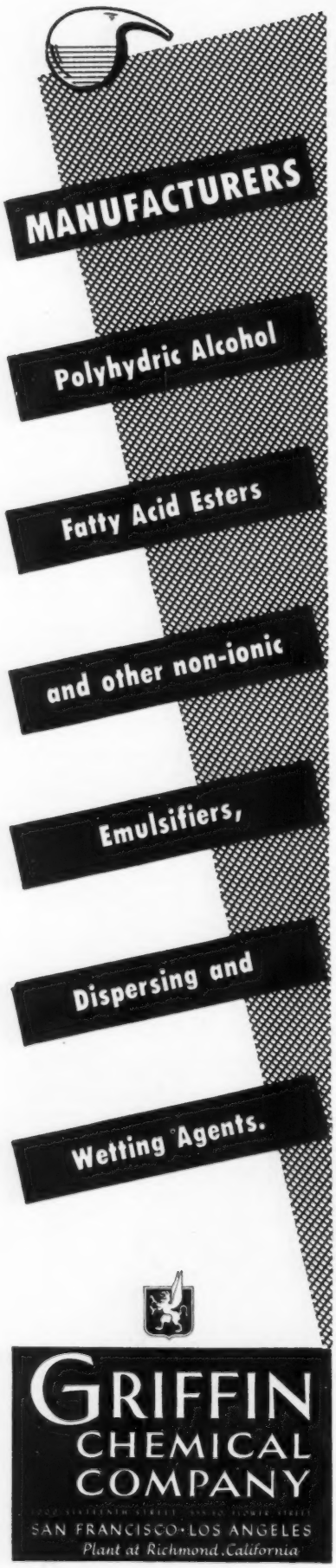

given thermal, kinetic, stearic, or resonance effects. Work on these topics has added power, and utility to the electronic theory of acids and bases and some recognition, even in appendix form, might improve future editions.

This book will be welcomed by teachers and should be particularly useful as collateral reading for undergraduate courses treating electronic mechanisms. The generously exemplified chapters on acid-base catalysis will interest and aid workers in this field.

Industrial Statistics

EXAMINATION OF INDUSTRIAL MEASUREMENTS by *John W. Dudley Jr.* McGraw-Hill Book Co., New York and London, 1947, First Edition 113 pages. $2.00. Reviewed by W. R. Pabst Jr., Navy Department, Bureau of Ordnance Quality Control Division, Washington, D. C.

HERE is a short book that attempts to acquaint the practical engineer with some of the uses of modern industrial statistics. It is intended to stimulate interest in the subject. It is non-mathematical in tone and not intensive in its treatment. The book introduces the concepts of averages and standard deviations, places emphasis on quality control technique as a means of interpreting variation about an average and of scatter about a regression line, sketches nicely some aspects of run and order statistics, and provides some practical problems. The book fails, however, to have a convincing practical flavor, the examples being in the nature of exercises rather than experiences. It has no specific references and only general references to the standard works in the field. It also fails to distinguish between population and sample statistics and perhaps in a misguided attempt at simplicity uses the equation for standard deviation uncorrected for degrees of freedom. This book may accomplish its purpose in stimulating interest among new-comers but it reveals the need for a more complete, intensive and enlightening introductory book in the fascinating field of industrial statistics and quality control.

Merchandising Fundamentals

MARKETING DRUGS AND COSMETICS, *by Louis Bader and Sidney Packer.* D. Van Nostrand Company, Inc., N. Y., 1947; 342 pp., price $5.00. Reviewed by W. Alec Jordan, Managing Editor, CHEMICAL INDUSTRIES.

THE MANUFACTURE of pharmaceutical products, cosmetics, and most chemical specialties is comparatively simple and requires but a minimum of equipment. As a result hundreds of small companies enter the business annually. A few succeed, but many fail. And in nearly all cases their failure can be attributed to ignorance of the principles of successful marketing: how to gain consumer and dealer acceptance, how and where to advertise, which markets to cultivate, how to profit from premium offers.

It is these fundamentals of merchandising—stressing the steps to be taken and the pitfalls to be avoided—which the authors outline so clearly in their text. Their observations are logically presented and interpreted, well written and comprehensive. Actually, this volume can serve either as a primer for the novice or a thought-provoking text for the experienced.

The subject matter is simply organized and the introduction of a new specialty is treated in a stepwise fashion. The problem of ascertaining the potential market, evaluating competition, selecting the best package, and developing marketing plans are thoroughly explored. Such incidental but important matters as obtaining dealer cooperation, designing displays and other promotional material, and deciding on the advisability of selling chain stores versus independent outlets, are also analyzed. Chapters devoted to financing expansion plans and summarizing government regulations pertaining to labeling practices, etc., should prove to be particularly valuable, especially to newcomers to the specialty field.

As a well-edited volume, replete with references to other sources of information, this book should prove helpful to specialty manufacturers, particularly in view of its eminently practical character.

High Polymers

PHENOPLASTS, THEIR STRUCTURE, PROPERTIES, AND CHEMICAL TECHNOLOGY, by *T. S. Carswell.* Interscience Publishers, Inc., New York, 1947; 267 pp., $5.50. Reviewed by F. E. Cislak, Director of Research, Reilly Tar & Chemical Corporation.

T. S. CARSWELL is manager of research and development for the Commercial Solvents Corporation. When he prepared this book he was directing plastic research for the Monsanto Chemical Co. From personal knowledge of the field, he is well qualified to write on phenolic plastics. The book is written in a very readable style and is a good job of book making.

"Phenoplasts" is not a handbook on the manufacture of phenolic resins or molding compounds. It is a compilation and interpretation of the published information on the properties of phenolic plastics. The commercial resin chemist, the engineer concerned with the specification of plastics materials, and the neophyte researcher will find the book very valuable.

The book has seventeen chapters. Of particular value are the six devoted to "Fillers for Phenoplast Molding Pow-

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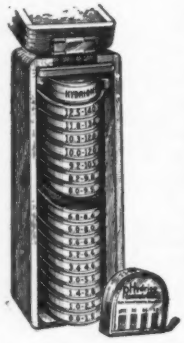

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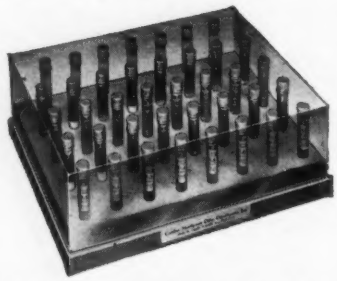

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ders," "Fillers and Resins for Phenoplast Laminates," "Mechanical Properties of Molded Phenoplasts," "Mechanical Properties of Laminated Phenoplasts," "Electrical Properties of Phenoplasts," and "Thermal Properties of Phenoplasts." These chapters are filled with tables and charts of data. Skillful organization is responsible for the tremendous amount of factual data contained in the one hundred sixteen pages devoted to these six chapters.

Chemical Requirements, 1960

AMERICA'S NEEDS AND RESOURCES: A SURVEY WHICH INCLUDES ESTIMATES FOR 1950 AND 1960, by *J. Frederic Dewhurst and associates.* Twentieth Century Fund, New York, N. Y., 1947; 812 pp., 225 tables, 42 figs.; $5.00. Reviewed by R. L. Taylor.

"WHEN we stand aside from the immediate concerns of this month or last, from the inflation or deflation of the moment, and take a long look behind, the minor ups and downs flatten out in a rising curve of economic activity, of increasing productive power, unique in the annals of this world. And when we project this curve into the future, assuming that we can continue to act as we have in the past, we begin to realize America's vast economic and social potential."

Thus does Evans Clark, executive director of the Twentieth Century Fund, assay in a foreword note the importance of this monumental three-year study by a corps of twenty members of the staff of his organization. The appraisal is a fair and conservative one, in the opinion of this reviewer.

The book is basically a study of past trends in consumer requirements for food, clothing, housing, household goods, transportation, recreation, education, medical care and religion; the relationships of these requirements to requirements for such things as capital, government expenditures, natural resources, and labor force; and then the projection of these trends and relationships to 1950 and 1960.

It will not be difficult for most producers of chemical materials to translate these projections into terms of their own products and markets. It must be remembered, however, as indicated in the title and many times throughout the body of the book, that the study is a forecast of *needs* and not of actual production or consumption. Thus the conclusions are of value only insofar as needs are an influence in determining production and consumption. That they are a powerful influence must be acknowledged. And that so powerful an influence has been studied and measured with such thoroughness is a matter of great good fortune for those charged with the job of long range planning in their respective organizations. To such people this book will be an indispensable working reference. For others it carries a remarkable story of America's past and future capacity for industrial achievement and social promise.

Organic Reagents

ORGANIC ANALYTICAL REAGENTS—Vol. II, by *Frank J. Welcher,* D. Van Nostrand Co., Inc., New York, 1947. 530 pp., set price, $7.00, single volume, $8.00. Reviewed by William H. Taylor, Jr., E. I. du Pont de Nemours & Co.

THIS BOOK represents the second volume of the author's comprehensive survey of the use of organic reagents in the detection and determination of chemical substances. The stated purpose in preparing these volumes was to assemble in one place a description of all organic reagents used in the analysis of inorganic substances, and to present a discussion of the methods employing these reagents.

As in the case of volume I, the author has, as far as practicable, grouped chemically related organic compounds in individual sections. The classes of organic compounds considered in volume II consist of organic acids, halogen substituted acids, hydroxy acids, amino acids, miscellaneous acids, acyl halides, acid anhydrides, esters, amines, and quaternary ammonium compounds. Reagents falling in each of these classes are discussed individually with regard to physical and chemical properties, methods of preparation, and use. Detailed procedures are described for the various detections and determinations for which the reagent has been found applicable.

In the opinion of the reviewer, volume II of Organic Analytical Reagents has the same commendable features and the same limitations as volume I. The noteworthy features consist of: (a) a comprehensive and complete bibliography; literature references follow the discussion of each individual reagent and are made so as to include the subject matter of each; (b) a double index system, one index being based on the names and synonyms of the organic reagents, the other based on the elements or substances detected or determined.

The limitations consist of the lack of a critical treatment of the described methods and the lack of any organization based on the substances to be determined.

It is believed that this volume of Organic Analytical Reagents is equally as valuable to the analytical chemist as volume I and both volumes are recommended as worthwhile additions to analytical chemical literature.

Other Publications

CANADIAN TRADE INDEX, 1947 edition, an alphabetical list of approximately 10,000 manufacturing firms with addresses, branches, brands and trade names and a classified list of industrial products with the names of firms manufacturing

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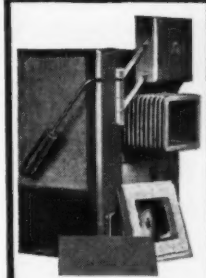

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them. Information about exporting is also given and there is a French index of products. Canadian Manufacturers' Assn., 67 Yonge St., Toronto 1, Ontario. $6.00.

INDUSTRIAL APPRENTICESHIP by Paul Bergevin presents the fundamental principles of apprenticeship education, and discusses various methods of organizing and administering an apprentice program. A bibliography and index are included. McGraw-Hill Book Co., 330 West 42nd St., New York, N. Y. $2.75.

INDEX TO A. S. T. M. STANDARDS AS OF DECEMBER, 1946, an adjunct to the 1946 Book of Standards. About 1400 specifications and tests are indexed and listed in numerical sequence of their serial numbers. A. S. T. M. Headquarters, 1916 Race St., Philadelphia 3, Pa. No charge.

THE MANAGEMENT LEADER'S MANUAL FOR OPERATING EXECUTIVES, Supervisors and Foremen, edited by James O. Rice and M. J. Dooher, a collection of previously published discussions on how to improve relations with groups and individuals. The book is designed for those who do not have regular contact with American Management Assn. reports. The Assn., 330 West 42nd St., N. Y. 18, N. Y. $3.00.

COOPERATIVE TESTING OF TORSIOGRAPHS AND CALIBRATORS discusses tests of electro-magnetic, photo-electric, mechanical-optical, mechanical and phase shift torsiographs and three torsional calibrators. The tests were conducted at the U. S. Navy Engineering Experiment Station by a committee from four industrial organizations and four Naval agencies. Society of Automotive Engineers, Inc., 29 West 39th St., New York 18, N. Y. $3.00 to SAE members, $6.00 to non-members.

SYMPOSIUM ON PLASTICIZERS includes a survey of plasticizers, studies of the effect of plasticizers on the viscoelastic properties of vinyl resins, theories of plasticization and the effect of plasticizers on certain mechanical properties of plasticized compositions. The papers were presented at the University of Buffalo on June 7-8, 1946, and are reprinted from the Journal of Polymer Science, Vol. II, No. 2. Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. $1.75.

REPORTING TO EMPLOYEES AND THE PUBLIC ON PROFITS AND PRODUCTIVITY, a collection of papers on stockholders and the annual report, reporting to employees, the public interest and productivity, profits and labor. Financial Management Series No. 88, American Management Assn., 330 West 42nd St., New York 18, N. Y. $1.00

BACTERIAL POLYSACCHARIDES by Taylor H. Evans and Harold Hibbert, a collection of data on dextran, the pneumococcus polysaccharides, and other less well-defined polysaccharides. The properties, chemical structure and industrial importance of these are discussed. Sugar Research Foundation, 52 Wall St., New York City. No charge.

Government Publications

OFFICE OF TECHNICAL SERVICES REPORTS

The following reports can be obtained from the Office of Technical Services, Department of Commerce, Washington 25, D. C.

MANUFACTURE OF PHTHALIC ANHYDRIDE AND PHTHALATES AT I. G. FARBENINDUSTRIE LUDWIGSHAFEN; PB-47718, 19 pgs.; microfilm, $1.00, photostat, $2.00.

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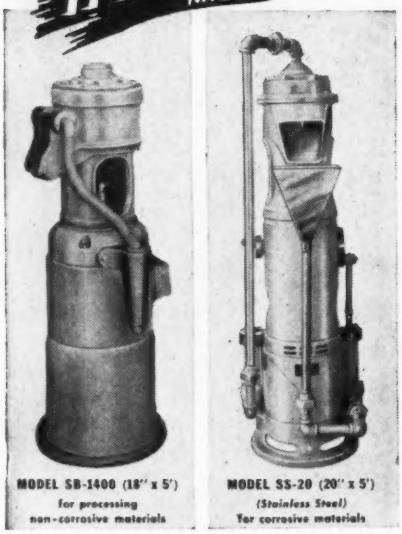

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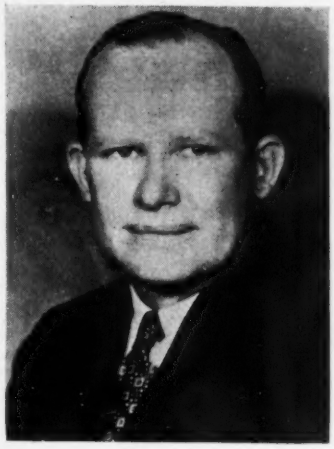
NEWS OF THE MONTH

Chemical Union Balks at Taft-Hartley Act

A recommendation that "no-strike clauses be omitted from contracts while the Taft-Hartley law is on the books" was made at the closing session of the AFL International Chemical Workers Union by its president, H. A. Bradley, at its recent annual convention.

"We do not care to be dragged into the jurisdiction of the courts any more than we have to," he continued. "By leaving out the no-strike clause, unions can better avoid coming under jurisdiction of the Act."

Roberts Named to Standard Board



Joseph K. Roberts, elected to the board of directors, Standard Oil Co. (Indiana). He is general manager of research for the company.

Chemical Dividends Climb

Publicly reported cash dividend payments by U. S. chemical companies in July were $24,000,000, compared with $19,600,00 in July, 1946. For the three months ending July 31, they amounted to $88,200,000, compared with $71,300,000 in the corresponding months last year.

Dividend payments by U. S. corporations in general were 13 percent higher this July than last.

Release Ammonium Nitrate Findings

Findings and recommendations of Part 1 of the report by the special inter-agency committee on hazards of ammonium nitrate have been released by the Treasury Department, which has supervision over certain Coast Guard activities.

The first part of the report covers the hazards of transportation of ammonium nirate fertilizer on board vessels. The second and third parts, to be completed at a later date, will cover hazards of land transportation and the results of chemical and physical tests of ammonium nitrate fertilizer. The first part was released on the ground that public safety required an early statement regarding hazards aboard ship.

Among the recommendations: (1) Promulgation by the Coast Guard of fire watch regulations for vessels loading or unloading ammonium nitrate. (2) Drafting of suggestive methods for combatting fires on ammonium nirate laden boats. (3) Designation of permitted loading and unloading ports and facilities. (4) Passage of local ordinances by municipal port authorities.

Significantly, the Department states that "experience and study indicate the explosive hazard of ammonium nitrate in normal land transportation is negligible."

USDA Sets Fats Exports

Fourth quarter export allocations of fats and oils authorized by the Department of Agriculture will total 452,500,000 pounds.

Included are 36,300,000 pounds allocated to export claimants in exchange for other fats and oils needed in this country, 15,500,000 pounds of drying oils, 17,100,000 pounds of soap, 33,100,000 pounds of various inedible fats and oils, 86,000,000 pounds of peanut oil, as peanuts, besides other quantities of edible fats.

Increase Stature of German Chemicals

The German chemical industry in the American-British zones of occupation will be raised to approximately 1936 capacity under the revised schedule of German industrial activity to be permitted in those areas, the State Department reports.

This represents an increase of 42 per cent over the permitted level initially authorized by the occupation authorities. However, a large number of explosive and chemical plants of special character will be removed as reparations or will be destroyed.

More than three-quarters of such removals comprise war explosives plants either already offered for reparations, or certified for destruction. Other changes authorized are: for plastics, retention of capacity somewhat larger than pre-war, with approximately one-fourth made available as reparations; dyestuffs, 34,000 tons per annum capacity to be retained, somewhat under pre-war, with one plant having capacity of 2500 tons of sulphur dyes, to be available as reparations; one pharmaceutical plant for atabrine production to be used as reparations.

Oldbury Promotes Stiegman

C. A. Stiegman, appointed director of technical service, Oldbury Electro-Chemical Co. He has been associated with the company for about ten years in general research, plant process development, and as head of the analytical laboratory.

Nationalization Threatens British Chemical Makers

Nationalization of Britain's important chemical industries may be deferred, but eventual government action affecting at least a large segment of the industry may come, in the opinion of technical observers who have recently been in Europe.

Related as it is to other large British industries, either nationalized already, or apparently headed for it, some parts, if not all of the chemical industry would have difficulty in escaping involvement.

Assuming the present trend continues, the gas industry, then steel, and finally upwards of 50 to 75 percent of the chemical operations, will come under government control.

Encourage Small Manufacturers On Govt. Bids

Small manufacturers and others desiring to participate in Government procurement contracts can now obtain information from any field office of the Department of Commerce as to what the Government is buying, where purchases are made, and how contracts are let, the Department has announced.

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Interested agencies also are working on a plan to simplify procurement and bidding regulations, looking toward a limitation of Federal specifications to essential elements and zone purchasing in smaller lots.

CALENDAR *of* EVENTS

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, 114th meeting, Chicago, Dec. 26-31.
AMERICAN CHEMICAL SOCIETY, New York section, M. L. I. G., New York, Oct. 31.
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, annual meeting, Detroit, Nov. 9-12.
AMERICAN OIL CHEMISTS' SOCIETY, annual fall meeting, Edgewater Beach Hotel, Chicago, Oct. 20-22.
ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS, Shoreham Hotel, Washington, D. C., Oct. 20-23.
EIGHTH PITTSBURGH CONFERENCE, Mellon Institute Auditorium, Pittsburgh, Nov. 13-15.
EXPOSITION OF CHEMICAL INDUSTRIES, Grand Central Palace, New York, Dec. 1-6.
NATIONAL METAL EXPOSITION & CONGRESS, International Amphitheatre, Chicago, Oct. 18-24.
NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION, annual convention, Ambassador Hotel, Atlantic City, Oct. 18-23.
PACIFIC CHEMICAL EXPOSITION, San Francisco Civic Auditorium, San Francisco, Oct. 21-25.
TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, fall meeting, Philadelphia, Nov. 3-5.
THE ELECTROCHEMICAL SOCIETY, INC., Boston congress, Oct. 15-18.

Investigate New Vegetable Oil

A new industry for Texas may come from the stillingia, or Chinese tallow tree, brought to the U. S. from China in the early 1900's and now found in vast numbers in the Texas Gulf Coast region.

In experiments made at Texas Agricultural & Mechanical College, and by other chemists, the stillingia seed has been processed in the tung mills and the residue found high in protein. It is also valuable as a cattle feed. It is foreseen as a rich source of vegetable oils and as a companion crop to the tung nut.

COMPANIES

The Chemical Dept. of THE QUAKER OATS Co. has established an Eastern sales office in the Whitehall Building, 17 Battery Place, New York City.

Adelia C. Boland, formerly in the Chicago Office, will now be the Chemicals Department representative in the New York office.

Operations of the FREDERICK STEARNS & Co. DIV., STERLING DRUG INC., will be gradually moved from Detroit, Mich., to a new plant at Myerstown, Pa. The company explains that the Detroit plant was much too large for the requirements of the Stearns business. The Myerstown plant, just completed, has 85,000 square feet of floor space.

CHEMO PURO MANUFACTURING CORP., has moved to the four-story building at 26-32 Skillman Avenue, Long Island City. The move incorporates plant, office, shipping and packing facilities under one roof.

American Potash Appoints Taylor

Henry L. Taylor, Jr., named manager of midwestern sales, American Potash & Chemical Corp. He will be located at the company's Chicago office.

DOUGLAS M. MCBEAN, INC., consulting engineers, Rochester, N. Y., has opened an office at 61 West 56th Street, New York 19, N. Y.

Net earnings of STANDARD OIL CO. (INDIANA) and subsidiaries totaled $40,936,430 in the first six months of 1947. For the first six months of 1946 the net earnings were $33,668,845.

BARADA & PAGE, INC., is constructing a warehouse and office building at Third Ave. and Tuskegee Street, Dallas, which will represent an investment of $60,000.

DOW CHEMICAL CO. plans to construct a $4,500,000 chlorine plant at Freeport, Texas. The contract has been awarded to the Tellepsen Construction Co. of Houston, and work will be completed in about a year.

Construction is underway on the $1 million phosphate plant for the newly organized GULF CHEMICAL COMPANY, INC. Location will be on a 19-acre tract north of the Houston Ship Channel and plans are to be in operation by January 1, 1948. A number of products resulting from the defluorination and chemical modification of Florida phosphate rock will be produced.

Officials of Gulf Chemical are George A. Butler, Houston attorney, president; Clayton N. Smith, vice-president; J. M. Sheesley, vice-president and treasurer; Cecil Cook, secretary, and William O. Taylor, assistant secretary and treasurer.

The HEATH CO., engineers and exporters, has recently been organized for the export of technical process equipment and chemicals. Its offices are at 150 Broadway, New York City.

MONSANTO CHEMICAL CO. has opened an office in the Widener Building, Philadelphia, Pa. It will handle all Monsanto sales, with emphasis on Organic, Phosphate, and Marrimac Div. products.

ARMOUR & CO. plans to construct a $2 million facility near Bartow, Florida for the production of triple superphosphate, used in the manufacture of fertilizers.

The CARBORUNDUM Co. has purchased a part of Plancer 168, formerly operated by Bell Aircraft Corp., from the War Assets Administration for $1 million. The property will be used primarily as manufacturing space for the coated products division.

HUKILL CHEMICAL CORP. has recently been formed as a sales organization in Cleveland, with offices at 4614 Prospect Avenue, Cleveland, Ohio, to handle specialized industrial chemicals and resins. Emory G. Hukill, Jr., president and general manager, was formerly with The Harshaw Chemical Co. and later sales manager of the Special Chemicals Co.

Hutchison Superintendent At Pittsburgh

Robert L. Hutchison, named general superintendent, Columbia Chemical Div., Pittsburgh Plate Glass Co. and the Southern Alkali Corp. His headquarters will be at the Columbia Chemical Div. offices.

NATIONAL CARBON CO. INC., New York, N. Y., has purchased for $1,637,000 the surplus carbon electrode plant that it operated during the war in Columbia, Tenn.

The facility consists of eight buildings covering a 21-acre tract.

Operating at capacity, the plant is now meeting requirements for carbon electrode supplies in Europe where similar plants have not been able to resume production

A research grant for the study of rutin has been made to the University of Nebraska by THE SMITH-DORSEY CO. The work will be under the direction of Harry Miller, director of the University's chemurgy project, a division of the College of Agriculture.

The HANSON-VAN WINKLE-MUNNING Co., Matawan, N. J. has completed a new Stratford, Connecticut office and warehouse at 382 Seymour Street, Stratford, Conn.

Construction operations on a $10,835,000 modernization program for the A. E. STALEY MANUFACTURING CO. have been under way for several weeks.

Included in the proposed work will be improvements to the present steep house, complete revamping of the mill house, and elimination of table house operations and modernizing the corn oil house.

GOODYEAR TIRE & RUBBER Co. is converting its wartime aircraft factory at Akron, to the production of plastic film and foamed latex. This will be known as the Special Products Manufacturing Div. Production is expected to start early in 1948.

R. T. VANDERBILT CO., INC. plans to construct a mill near Fowler, N. Y., to produce talc. The talc deposits in the vicinity are among the largest in the world.

HANDY & HARMAN and THOMAS J. DEE & Co. have joined forces. The latter company will become the Dee Div. of Handy & Harman, and the present executives of the companies will remain in charge.

VITAMIN SALES CORP. is building a vitamin concentrating plant at Simonstown, South Africa. This will be the first plant for vitamin manufacture in the Country.

CANADA

New Sulfite Alcohol Project Planned

Construction of what will be the world's largest plant for the production of ethyl alcohol from sulfite liquor is planned by Commercial Alcohols Co., Ltd., Montreal. Estimated to cost about $2.5 million, the facility is being designed to yield two million gallons of ethanol annually, based on processing 700,000 gallons of sulfite liquor daily.

To be located adjacent to the Gatineau Mill operated by Canadian International Paper Co. it will be on the Quebec side of the Ottawa River—some five miles from the city of Ottawa. The process to be used will be a variation of one that has been used in Sweden and will include the utilization of vacuum distillation.

At present the Dominion has only one plant producing ethanol from sufite liquor, operated by the Ontario Paper Co. at Thorold, Ont. It has a capacity of about 700,000 imperial gallons of alcohol per annum.

Increase Chalk River Isotope Output

The heavy water atomic energy pile at Chalk River, Ont., described by Reconstruction Minister C. D. Howe as the largest in the world, is now producing quantities of radioactive isotopes.

The unit, which went into operation last spring, is about twice the size of the low energy pile which Great Britain placed in operation two months ago.

Monsanto Expands Its Canadian Interests

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two years is planned by Monsanto (Canada) Ltd.

Apart from the company's polystyrene project, enlarged facilities for the manufacture of phenolic resins are to be constructed. Complete details of other extensions have not as yet been drafted.

Plan Western Salt Exploitation

A new company, to be known as the Alberta Salt Co., has been formed recently as a concern jointly owned by Anglo-Canadian Oils, Home Oil and Calgary and Edmonton Corp. Present plans are for the construction of a $500,000 salt refinery 100 miles northeast of Edmonton.

The planned project is the outgrowth of 1946 discovery of 1,000 feet salt beds in the Elk Point district. The company claims to have 200,000 acres under reservation **permit.**

Sherwin-Williams Brings In Resin Unit

The Sherwin-Williams Co. of Canada, Ltd., has brought into operation a new unit for the manufacture of alkyd resins and varnishes at Montreal. Existing varnish facilities are capable of producing 1,500,000 gallons annually, whereas it is expected that the new unit will ultimately permit an output of double that quantity.

The recently completed resin unit is a part of the company's $2.5 million expansion program.

Company Notes

RHEEM MANUFACTURING Co., fabriicators of steel shipping containers, has formed a Canadian subsidiary under the corporate title of Rheem, Canada, Ltd. Offices and plant are located at Hamilton, Ont.

Distribution of Eastman acetate dyestuffs, made in the U. S. A. by TENNESSEE EASTMAN CORP., will henceforth be handled by CLOUGH CHEMICAL Co., Montreal. For the past two years the dyes have been marketed by Canadian Kodak Ltd., Toronto.

PERSONNEL

Company Officers

M. VINCENT O'SHEA, JR., has been appointed to the new office of administrative vice president for Merck & Co., Inc.

He has previously been executive vice-president of the O'Sullivan Rubber Co., president of the Robert Teller Sons & Dorner Co., and president of Rosemarie de Paris, Inc. He was formerly a partner of Swart, Brent & Co.

EMMET F. HITCH, special assistant to the management of the duPont Chambers Works, Deepwater Point, N. J., has retired after 29 years with the company. He is joining the faculty at Purdue University as professor in the department of chemistry.

Roller Joins Atlas

O. Frederic Roller, Jr., new member of the Development Department, Atlas Powder Co. He was formerly with Publicker Industries, Inc.

LEE PLAGEMAN has been named auditor for the new plastics plant which The B. F. Goodrich Co. will operate in Marietta.

He has been with the organization for the last 20 years.

Research

LOUIS KOENIG has been named chairman of chemistry and chemical engineering research at Armour Research Foundation, Illinois Institute of Technology. For the past two years he has been a chemical consultant in New York City.

E. J. KAHLER, formerly research chemist with the Springfield, Massachusetts, plant of the Monsanto Chemical Company, has joined the staff of Battelle Institute, Columbus, Ohio.

COLONEL MARSHALL STUBBS has been appointed deputy chief, Research and Engineering Division, and MAJOR CLAUDE W. WHITE, named executive officer, at the Army Chemical Center, Maryland. The Research and Engineering Division directs and coordinates research and development program of the Chemical Corps.

BRUCE S. OLD has been appointed consultant to the Atomic Energy Commission, Division of Research, in the capacity of chief metallurgist. He will continue his present work with Arthur D. Little, Inc., and will serve the Atomic Energy Commission on a part-time leave of absence from that company.

SAMUEL SPRING, formerly a research specialist for the Federal Government, has been appointed to the Research and Development staff of the Pennsylvania Salt Manufacturing Co. He will have charge of the inorganic research group at Pennsalt's Whitemarsh Research Laboratories.

JOHN R. SKEEN has joined the staff of Foster D. Snell, Inc., consulting chemists and engineers, New York, as account executive in charge of market research. He came to the Snell organization from

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@ 68°F., lb. per gal.	5.183	Coefficient of Expansion (−15 to +20°C.), per °C.	0.00184
Specific Heat @ −4.4°C.	0.518	Critical Pressure, atmospheres	42.6
Boiling Point, °C.	−4.41	Critical Temperatures, °C.	163.1
°F.	24.06		

**National Bureau of Standards and M. P. Doss, "Physical Constants of the Principal Hydrocarbons", 1943.*

For further information, contact

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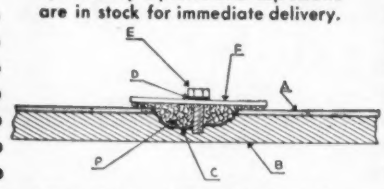

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the staff of the Bureau of Internal Revenue.

GEORGE W. IRVING, JR., has become an assistant chief of the U. S. Dept. of Agriculture's Bureau of Agricultural and Industrial Chemistry.

In his new position Dr. Irving, along with two other assistant chiefs, will participate with the chief in the planning and administration of the Bureau's research and development activities.

G. F. D'ALELIO has become an assistant director of research for Koppers Co., Inc. He holds 248 patents, most of which are in the field of high polymers or plastics, and at the present time has nearly 100 patent applications pending.

ROY P. WHITNEY, formerly of the University of Maine has joined the staff of The Institute of Paper Chemistry. He will have the rank of research associate and will engage in teaching and research work.

Riley to Manage Westvaco Sales

Walter J. Riley, appointed divisional sales manager, technical sales division, Westvaco Chlorine Products Corp. He has been with Westvaco since 1936.

Production

C. L. PARISH has been named maintenance superintendent of Monsanto Chemical Co. Prior to his appointment he was electrical engineer for the company's Phosphate Division.

L. H. PRIDAY, plant manager at Parlin, N. J., for E. I. du Pont de Nemours & Co., has been transferred to Wilmington as assistant director of production. He succeeds M. A. DIBBLE, who recently became assistant manager of the Finishes Division.

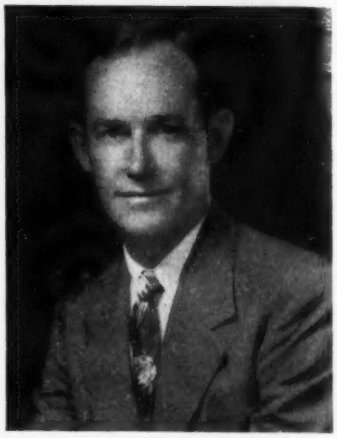
ALBERT MUSSCHOOT, a member of the general engineering staff of Link-Belt Co. at Philadelphia, has been appointed assistant to the chief engineer. He is a mechanical engineering graduate of Massachusetts Institute of Technology.

Sales

Shell Chemical Corp has appointed BARCLAY K. READ as assistant sales manage of its Western Division with headquarters in San Francisco. Prior to his new appointment, Mr. Read had been with the company's Eastern Division in New York in a similar capacity.

G. WESLEY GATES has been named manager of container sales, Eastern division, for Rheem Manufacturing Co. He succeeds A. H. CAMPBELL who has resigned. Mr. Gates joined Rheem in 1942.

Baker Promotes Slater



C. H. Slater, chosen assistant general sales manager, J. T. Baker Chemical Co. Mr. Slater will devote a major portion of his time to the management of the Fine Chemical Division.

MORGAN POTTS and J. HARVEY KISLING have joined the New York sales staff of National Starch Products Inc. and its National Adhesives Div.

FRED K. SHANKWEILER, formerly manager of Hercules Powder Co.'s Cellulose Products Department office in Chicago, has been appointed manager of the department's office in New York. He joined Hercules in 1929, as a chemist at the Experiment Station.

JOHN E. WEBER has joined the engineering staff of the Project Engineering Co., N. Y., as sales engineer. He was formerly connected with The M. W. Kellogg Co., later with its subsidiary, the Kellex Corp.

V. F. HARRINGTON has joined the technical sales staff, Alrose Chemical Co., as New England representative. He will be engaged in sales development and technical service of surface active agents. He is a graduate of Massachusetts Institute of Technology.

WILLIAM N. MCKEE has been named industrial sales manager of the W. A. Cleary Corp., N. Y. He will have charge of the sales of germicides, fungicides and herbicides. He was previously with the Shell Oil Co.

J. J. AUSTIN has been appointed sales agent, Polymer Industries, Inc., to handle adhesives and impregnants in the New England area. He was formerly with Dewey and Almy Chemical Co., and is also connected with Austin Industries.

AUSTIN F. TOMES has been made Eastern branch manager, Truscon Laboratories, a division of Devoe & Raynolds Co. He has previously been field sales manager, the A. C. Horn Div., the Sun Chemical Corp.

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CHEMICAL SPECIALTIES

A department devoted to news of the chemical specialties field. Descriptions of new specialty products will be found in the New Products & Processes department.

Small Package Quaternary Crystals

Quaternary ammonium chloride, the germicide, is now being marketed under the trade name, Disilyn, in light, ready-measured packets of water soluble crystals, by Lynwood Co., Chicago. Elimination of spilling, breakage, and bulky packages are advantages claimed for this paper-wrapped germicide container.

Each of the new packets, which come in dispensers, contains enough crystals to make standard germicidal solutions for controlling bacteria and fungus and for disinfecting and deodorizing. One full dispenser weighs only 14 ounces, as opposed to the 8½ pound weight of its equal, a one-gallon bottle of liquid quaternary.

The crystals, which are soluble in water of any temperature and degree of hardness, are crystalline Hyamine, the quaternary ammonium compound manufactured by Rohm & Haas Co., Philadelphia.

Glidden Introduces Foundry Mold Lacquer

A new lacquer, designed to preserve and protect wood foundry patterns, is now being marketed by the Glidden Co.

Among the claims made for the product: resistance to water, oil and kerosene, heat and abrasion. Too, it does not become brittle with age and the coating minimizes adherence of sand to the mold.

It is being offered in clear, clear orange, yellow, vermillion and black types, all of which air dry in 15 minutes.

Test Adhesive for Seed Treatment

Polyethylene polysulfide (p.e.p.s.), the new agricultural chemical recently introduced by B. F. Goodrich Chemical Co., is now being used for treating hybrid seed corn against plant killing, soil-borne organisms. Serving as an adhesive, p.e.p.s. mixed with the standard seed treatment chemicals and applied by the slurry method, holds the chemicals on the seeds.

Field-tested in the corn belt under the extremely wet and resulting severe growing conditions of the 1947 season, germination of hybrid seed corn was increased from a normal of 92% to as much as 98%. Moreover, one to three days faster emergence and more vigorous plants were observed.

The adhesive character of p.e.p.s. also practically eliminates respiratory irritation encountered by workers in dusting and handling the standard treatment chemicals. Prior to the development of p.e.p.s. this occupational hazard was reduced by applying the chemicals as a water dispersion and then after drying, handling the seed corn in paper lined bags.

It is used in dilution of one pound per ten gallons of water and the "slurry" applied at ½% of the seed weight.

Towle to Sharp & Dohme

Edward C. Towle, made pharmaceutical production manager, Sharp & Dohme, Inc. He worked formerly with Lever Brothers Co. in the General Manufacturing Division.

Malmstrom Expands Wool Grease Facilities

To meet the increasing demand for its products, N. I. Malmstrom and Co. has increased the capacity output of its Brooklyn, N. Y. plant.

The facilities of the Chicago office have also been enlarged by moving to new quarters at 444 West Grand Avenue, Chicago 10.

Joint Research Yields Polyvinyl Paint

A new paint, made from a water dispersion of a synthetic resin instead of customary drying oils, dries in less than half an hour without odor, yet possesses the durability and finish of high class oil paints, has been developed by research conducted jointly by Foster D. Snell, Inc., and Shawinigan Products Corporation, New York.

The vehicle of the new coating is a dispersion of polyvinyl resin in water. The pigment and polyvinyl resin are dispersed in water with one per cent or so of a synthetic wetting agent. The product can be brushed or sprayed on in the same manner as an ordinary paint. The applied paint dries in less than half an hour to yield a hard film.

When dry, the painted surface can be washed and scrubbed without harm, just as an oil paint can be, and is stable to air oxidation, but its speedy drying and freedom from odor are valuable advantages over the usual oil paints, especially for interior use.

Unique Paint for Canvas Preservation

A new paint, designed to flameproof, mildewproof, waterproof and weatherproof canvas, contains as its essential ingredients: chlorinated solids, solvent germicides, and a combination of earth pigments.

It is applied by brushing into the fibres of the cloth and then is allowed to dry for half an hour. An optional procedure is dipping the canvas in the composition for three minutes and squeeze-drying.

The New York City Board of Standards has approved the compound as a fire-retardant specialty.

DDT Cuts Corn Borer Losses

Though corn borer damage in the United States reached an estimated $37,000,000 in 1946, it was demonstrated adequately in the same season that corn borers can be controlled by application of certain insecticides at required intervals.

DDT compositions were used extensively in large-scale demonstration tests of the Midwest and in commercial production of sweet and field corn. Increased profits were $20 and $30 per acre or even greater, and planting schedules were normal.

To obtain the maximum protection on heavily infested corn, three or sometimes four sprays or dusts are applied at about 7-day intervals.

Cristy Promotes New Package

The Cristy Chemical Corp., Worcester, Mass., is now packaging its product, Drygas, in metal containers. Hitherto the company has marketed its gasoline conditioner in glass bottles. The new package is lithographed in three colors —red, black, and white.

Drygas is sold as a specialty to be added to gasoline to eliminate water in automotive fuel systems, and is also claimed to minimize carbon fouling of spark plugs and to improve upper cylinder lubrication.

Bruce Pushes Floor Cleaner Sales

The E. L. Bruce Co., Memphis, Tenn., originally a manufacturer of hardwood flooring, and now producing a line of floor maintenance specialties, will soon open a national advertising campaign to

promote Bruce Floor Cleaner. Along with the cleaner, which is being marketed at 68¢ a quart, the company will feature a mop-like gadget, equipped with a replaceable steel wool pad, and designed to be used for floor cleaning.

Major theme of the advertising campaign will be that water actually harms floors, that a cleaner containing no water should be used.

Apart from the cleaner Bruce also makes floor waxes, finishes, and linoleum seal.

Searle Triples Production Facilities

Two further additions, which will more than triple the research and manufacturing facilities of G. D. Searle & Co., as compared to 1945 production, are now being planned.

The new additions to the pharmaceutical laboratories, involving an expenditure of $1,000,000, will be a one-story and penthouse pharmaceutical manufacturing building and a new wing to the company's research building. The first will house the granulating, tableting, coating and liquid departments. The second will house all laboratories devoted to research in organic chemistry.

Study Formulation of Stable Creams

Elimination of some of the worries which confront makers of shaving creams, cosmetic preparations and lubricating greases may be realized as a result of studies recently reported by Todd M. Doscher and Robert D. Vold of the University of Southern California.

These materials, which are blends of soap, oil, and water, often deteriorate in storage. Most frequent troubles: shaving creams harden in the tube, ointments turn to jelly, oil separates from lubricating greases.

The key constituent is the soap molecule, which is shaped like a pencil. One end is soluble in oil, the other in water. If a mixture of soap and oil is heated and then allowed to cool, it turns to jelly. Such a material, because it lacks oiliness and breaks under an applied force, is obviously not satisfactory as a lubricating grease.

To make matters still worse, if this jelly is allowed to stand, it begins to shrink, and oil is exuded. The separation of oil and the shrinkage continue until nothing is left but a suspension of solid particles in oil.

This complete breakdown results because no water is present. The water-soluble ends of the soap molecules are repelled by the oil and strongly attract each other. A tight network of soap molecules results, and as this net constricts, the oil is squeezed out.

If a little water is mixed with the soap and oil, a satisfactory grease or cream can be produced. The water-soluble ends of the soap molecules absorb water and are prevented from attracting each other strongly and forming networks.

On the other hand, if more than enough water is added, the water and oil will separate and form an emulsion.

Although complete data on all possible mixtures of soap, oil, and water have not yet been collected, intensified research along these lines may lead to better formulas for greases and creams.

Interchemical Elects Hemingway

Harry J. Hemingway, elected vice-president, Interchemical Corp. He will assume over-all management responsibilities, and will also have executive supervision of R-B-H Dispersions Division.

Folic Acid and Rutin Specialties

Two new pharmaceutical specialties, folic acid tablets and rutin tablets, were placed on the market recently by Sharp & Dohme, Inc., Philadelphia.

The former have proved to be effective in the treatment of certain types of anemia, the latter are prescribed as a remedy for capillary fragility.

Composition of Flameproof Powders Approved

The composition of two powders, marketed as flameproofing agents for the treatment of textiles, paper, etc., and approved by the New York City Board of Standards, is as follows:

(A)

Ammonium phosphate	67 per cent
Ammonium chloride	16 " "
Borax	16 " "
Inert material	1 " "

The mixture is described as being a white, crystalline powder soluble in water at 65 F. A solution made therefrom on the basis of one pound to a gallon of warm water—can be applied to materials to be flameproofed by dipping, brushing or spraying.

Another blend of ammonium chloride,

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GLOSS? HARDNESS?

Investigate Petrolite Crown Quality Waxes 700 and 1035. Their extreme hardness and glossiness are effective in any formulation requiring gloss.

	MELTING POINT °F MIN.	PENETRATION 100 GM.	COLOR N.P.A.
Crown 700	190/195	5 Max.	2 to 2½
Crown 1035	195/200	2 Max.	2 to 5½

EMULSIFICATION?

Petrolite Crown Waxes 23 and 36 are especially applicable in no-rub polish formulations. Used to extend more costly vegetable waxes, they are extremely economical, without detriment to the resulting product.

	ACID NUMBER	SAPONIFICATION NUMBER	COLOR N.P.A.
Crown 23	20 - 25	55 - 65	4½ - 6
Crown 36	30 - 35	85 - 95	5½ - 8

Emphasis here of these features of Petrolite Crown Quality Waxes in no way tells the entire story. The Petrolite line includes a variety of waxes with widely differing characteristics and many economical advantages. Write today for the Petrolite Wax booklet and samples.

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PETROLITE WAX

PETROLITE CORPORATION, LTD.
Wax Division
29 Broadway, New York 6, New York
Refinery, Box 390, Kilgore, Texas

borax, and a small percentage of ammonium sulphamate also gained the Board's approval.

New Remedy for Athlete's Foot

A new product for the treatment of Athlete's Foot, tradenamed Scape, was introduced this month by the Georges Bean Pharmacal Co., New York City. National and international distribution are planned in the next few months, according to the company.

Scape, a penetrating, greaseless, white ointment, contains caprylic acid, sodium caprylate, zinc caprylate, propyl alcohol and other ingredients in a water-miscible base.

Controlled experiments with Scape, according to the company, show that at the end of one week only 50% of the patients treated had positive fungi. This percentage was reduced to 27% at the end of the second week and to 13% at the end of three weeks. At the end of the three week period 69% of the "controls" (those not treated) had positive fungi.

Miles Acquires Ethical Subsidiary

Miles Laboratories, Inc., Elkhart, Indiana, has purchased Chemical Specialties, Inc., Zeeland, Michigan, through the exchange of common stock.

The company, under its new ownership, will operate as a completely separate corporation at its present location. It is presently producing Carbromal, Bromural, Phenestal and several other pharmaceutical chemicals. Plans are under way for further expansion and addition to its line.

Lucas P. Kyrides, former director of research of the Organic Chemicals Division, Monsanto Chemical Company, is the new president of Chemical Specialties, Inc.

Cyanamid Promotes New Textile Finish

A durable moire finish which is not affected by water spotting or by wet cleaning by dry cleaners has been developed by the Textile Resin Department of the American Cyanamid Co. The finish is a thermosetting resin which is heat-cured so that the moire effect becomes permanently a part of the fabric.

The finish is applied by passing the goods through a bath containing the thermosetting resins in solution and drying the fabric at a low temperature before embossing. After the moire effect has been applied on the calendar the goods are cured so that the effect becomes permanently a part of the fabric.

Du Pont Goes After Foreign Sales

The automotive finish developed by the Du Pont Co., and introduced under the tradename of Duco Metalli-Chrome, is now being offered in export markets.

Since its introduction in May, 1946, sales have been confined to the U. S., but a recent easing in raw material supplies has resulted in more normal production conditions and the company's Finishes Division is currently cultivating overseas business.

New Black Leaf Mosquito Fumer

Working on the principle of the "smoke aerosol," a new mosquito fumer has been developed by the Tobacco By-Products and Chemical Corporation of Richmond, Virginia.

The fumer consists of a small can containing 14 per cent D.D.T. in a combustible base. A perforated crown with a glacine window is used as a seal. The window in the seal is melted with a burning sparkler which in turn ignites the mixture, thus emitting a dense smoke under pressure.

Develop Novel Metal Coloring Agent

The Hanson-Van Winkle-Munning Co. Matawan, N. J. has developed a new liquid composition for coloring nickel, brass, copper, aluminum and zinc die castings. The product is known as Acme Grade 4-L-10.

It is recommended for use with pressure type composition spray equipment.

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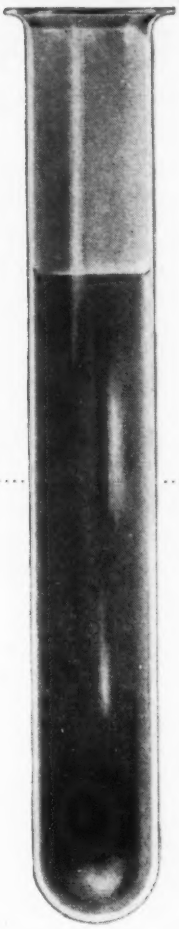

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CHEMICAL MARKETS

More Tall Oil in Prospect

Production of tall oil, raw material for paints, soaps, etc., may well hit an all-time high of about 125,000 tons this year, according to present estimates. Moreover, there are indications that output within the next few years will far exceed this tonnage.

Of particular importance in this connection is the awakening interest that papermakers now have in the reclamation of by-products. It is not improbable that within a matter of a decade paper mills may become essentially chemical plants, and that the dollar volume of their chemical output will form a substantial proportion of total revenue.

At present, tall oil is one of the lowest priced fatty materials on the market, and refined tall oil, and derivatives thereof, perform the same functions as other oils—such as the more expensive linseed. In the crude state likewise, it has many commercial uses, particularly in cases where color and odor are not factors. A heavy tonnage of the crude finds its way into industrial soaps, as an ingredient of linoleum, as a flotation agent, and as a component of some road-building materials.

It was not until the middle '30's that tall oil recovery, originally practiced in Sweden, was introduced to the U. S. As late as 1937 total U. S. output was only about 10,000 tons annually; today it is more than ten times that. And there is every reason to believe that more tall oil will be forthcoming soon.

Shellac Market Continues Dull

The shellac market has been dull in view of high prices and increased dealer inventories. Domestic demand is below normal. However, with greater activities anticipated in the building trades, consumption is expected to increase. High prices of India's lac products have developed considerable buyer resistance and the use of synthetics has increased.

Prospects for the all-India 1947 Baisaki and Jethua (summer) lac crops indicate that production will be about 50 percent of last year's crops which amounted to approximately 44,000 long tons.

Sharp Upswing Features Talc Market

The quantity of domestic talc, pyrophyllite, and ground soapstone sold or used in 1946 was considerably greater than in 1945, according to reports of the producers to the Bureau of Mines. This output, 457,066 short tons—was a new record—exceeding the former record set in 1941 by over 40,000 tons. The total value of $6,445,344 in 1946 was over a million dollars greater than in 1945 and was an all-time record. The average value per ton rose from $13.57 in 1945 (revised figures) to $14.10 in 1946.

New York, in 1946, was still the leading producing State by a considerable margin, with North Carolina in second place. Increased sales were reported in many of the States in 1946. Sales of the leading States, California, Georgia, and North Carolina, reached new levels. Total sales of pyrophyllite, most of which comes from North Carolina, increased 24 per cent in 1946 over 1945.

Five industries—paint, rubber, roofing, ceramics, and insecticides—consumed 77 per cent of the sales of domestically produced talc, pyrophyllite, and ground soapstone, in 1946, according to reports from the producers. Increases were reported in sales to the paint, rubber, roofing, ceramics, insecticides, and paper industries. Especially notable were the increases in the ceramic and insecticides industries. Consumption in paint was easily the leading use with 23 per cent of the total. The rubber, ceramics, and insecticides industries were close competitors for second place, each taking about 14 per cent of the total.

Record Activity in Phosphate Mining

Phosphate rock sold or used by producers in 1946 also attained a new peak of 6,860,713 long tons (an increase of over a million tons) valued at $31,043,821, which is over 7 million dollars more than the 1945 total. The marketed production from Florida and the Western States in 1946 was also greater than ever before and in the case of Tennessee was greater than in 1945.

Imports declined; exports increased 29 percent. Apparent domestic consumption was 6,287,112 tons. Stocks at the end of 1946 had increased to 1,211,000 tons. The P_2O_5 content of the domestic phosphate rock sold or used in 1946 reached a new high—2,216,978 long tons.

Inorganic Chemical Production Shaded

Production of inorganic chemicals in the month of July declined slightly in comparison with June but maintained a relatively high level, according to the Bureau of Census, Department of Commerce. A survey of 35 industrial chemicals disclosed that 19 were produced in lesser volume in July than in June, and only 9 were produced at a lower rate this July than in July 1946.

Chemicals whose production fell in July but held up well above a year ago include the acids—nitric, phosphoric (except from phosphate rock) and sulfuric—chlorine, oxygen, caustic soda and salt cake. Those whose production fell below July 1946 were: chrome green and molybdate chrome orange, dibasic calcium phosphate, lead arsenate, silver nitrate, sodium bicarbonate, and natural methanol. Record high production of carbon dioxide (liquid and gas and solid), natural soda ash, and phosphoric acid from phosphate rock was achieved during the month. Calcium arsenate and hydrogen were produced in larger quantity this July than during any month in several years.

Alcohol Gallonage Up

Production of ethyl alcohol totaled 26,832,989 proof gallons during the month of July, the Alcohol Tax Unit, Treasury Department reports.

The figure is 3,040,589 proof gallons greater than the June figure and more than 9,000,000 gallons greater than the July, 1946.

Production of completely denatured alcohol rose from 2,476,829 wine gallons in June to 3,216,242 wine gallons in July.

Withdrawals of alcohol totaled 3,185,239 wine gallons and stocks on hand reached 132,406 wine gallons.

Production of specially denatured alcohol, on the other hand, showed a slight decline from 11,673,010 wine gallons in June to 11,388,961 wine gallons in July.

U. S. PRODUCTION OF ALCOHOLS AND GLYCOLS
(*Thousands of pounds*)

	January-May	
Commodity	*1946*	*1947*
Butyl alcohol	42,678	61,176
Ethylene glycol	[1]	81,314
Methanol:		
Natural	6,552	7,007
Synthetic	187,396	224,781
Glycerin (100% basis):		
Crude	70,183	86,228
High gravity and yellow distilled	29,486	38,623
Chemically pure	38,080	42,397

[1] Not available.
Source: Compiled from data supplied by the U. S. Tariff Commission and the Bureau of Mines.

Synthetic Organics Exceed $2 Billion

In 1945 the sales value of synthetic organic chemicals and their raw materials produced in the United States totaled 2.2 billion dollars, according to a final report released by the United States Tariff Commission. The quantities produced (37 billion pounds) and sold (25 billion pounds) were about the same as in 1944. Outstanding among the several groups of items produced were synthetic rubber, coal-tar intermediates, and plastics materials.

The total quantity of all tars (oil-gas tar, water-gas tar, and coal-tar) produced in 1945 is estimated at 899 million gallons, 7 percent less than the output in 1944 of 971 million gallons. This decline

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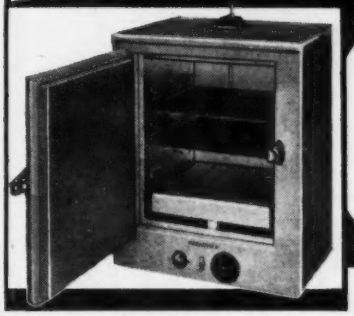

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reflected in part the reduced output of coke as a result of the steel strike.

Among the tar crudes, the output of benzene, toluene, and cresote oil decreased in 1945 compared with 1944. Benzene dropped by 12 per cent and toluene and cresote oil each by 2 per cent. Production of naphthalene continued at about the 1944 level of 290 million pounds.

Production of crude products from petroleum and natural gas for chemical conversion amounted to 3.3 billion pounds and sales amounted to 2.8 billion pounds, valued at 214 million dollars.

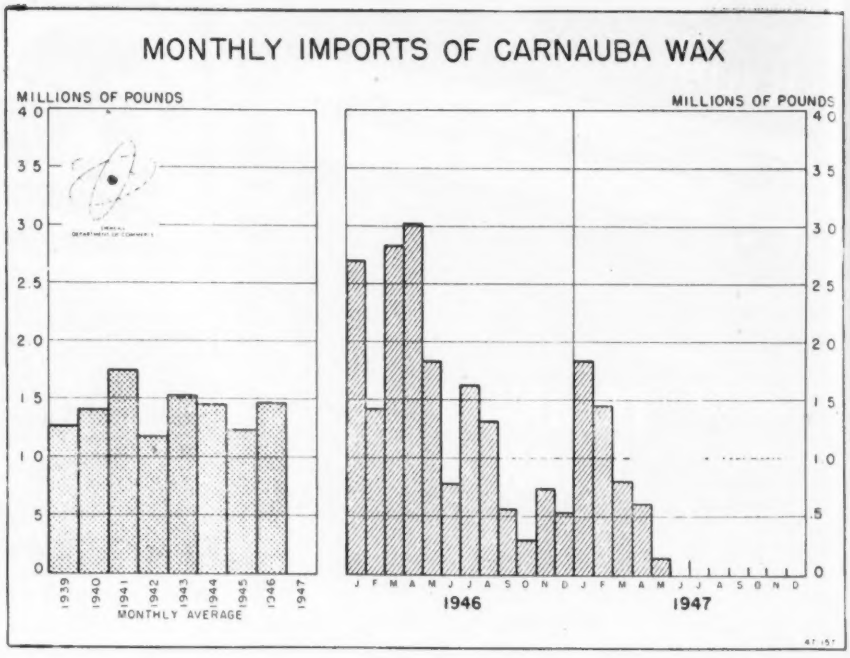
In 1945, the output of coal-tar intermediates totaled 2.3 billion pounds, an increase of 9 per cent over that in 1944. Reported sales of 1.3 billion pounds, valued at 143 million dollars, represented 54 per cent of the total quantity produced, compared with a much larger proportion in 1944.

Production of finished chemical products (including acyclic intermediates) was 12.4 billion pounds, a decline of 3.2 per cent from the quantity produced in 1944. Sales totaled 8.1 billion pounds, valued at 1.7 billion dollars, a decrease of 4 per cent in quantity and 6 per cent in value from sales in 1944.

Among the finished products the greatest gains in output were reported for surface-active agents (which include detergents), color lakes and toners, medicinals, and flavor and perfume materials. Decreases were reported for dyes and miscellaneous chemicals. In quantity dyes dropped 5 per cent and miscellaneous chemicals 6 per cent below the 1944 level.

Sulfur Stocks at Ten Year Low

Sulfur production in July surpassed the record set in May of this year and mine shipments again exceeded production. The cumulative totals of sulfur produced and shipped during the first 7 months of 1947 were 14 and 24 percent greater, respectively, than in the same period of 1946. Stocks have been reduced steadily during 1947 and at the end of July were lower than they have been in nearly 10 years.



Production, mine shipments, apparent sales, and producers' stocks of native sulfur in the United States in selected periods, 1937 and 1946-47, in long tons:

Period	*Production*	*Apparent sales*
May 1947	377,218	430,910
June 1947	359,313	398,242
July 1947	382,674	400,389
Jan.-July 1947	2,423,023	2,754,024
Jan.-July 1946	2,128,739	2,283,589

Resin Emulsion Paints Reach $1.5 Million

Sales of resin emulsion paints in July amounted to 766,507 gallons valued at $1,538,547. These sales were divided as to the interior and exterior types as follows: Interior—752,362 gallons valued at $1,504,434; Exterior—14,145 gallons valued at $34,113. Sales of cold-water paints totalled $848,760, of which $503,239 represented the interior type and $345,521 the exterior type.

The quantity of plastic water paints sold in July 1947 was 2,506,090 pounds valued at $197,413 compared with July 1946 sales of 1,678,772 pounds valued at $115,070. Total calcimine sales in July of this year amounted to 1,482,473 pounds at a value of $83,087 compared with the July 1946 sales of 1,658,723 pounds and $73,170. This was an 11 per cent decrease in quantity accompanied by a 14 per cent rise in total value.

First Half Rubber Consumption Gains

In its monthly report on the use of all types of crude rubber, The Rubber Manufacturers Association notes a 15.74 percent increase in consumption over the first half of 1946, a year in which the industry consumed 1,039,000 long tons of natural and synthetic rubber. That was an all-time high, and compared with an average annual consumption of less than 500,000 tons in the ten years prior to the war.

Consumption in the first six months of 1947 totalled 571,774 long tons of all types of crude rubber. This compared with 494,018 long tons in the first six months last year. In addition to crude, the industry used 147,593 long tons of reclaimed rubber.

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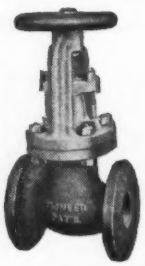

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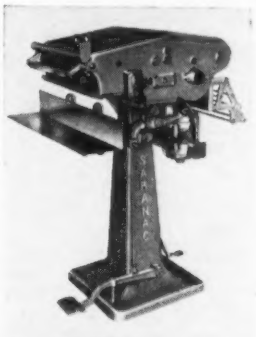

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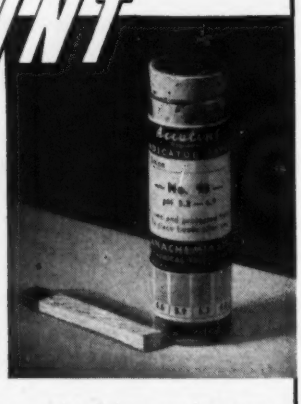

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Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
September, 1945, $0.864 September, 1946, $0.767
September, 1947, $0.60

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Acetaldehyde, 99%, drs.wks..lb.	.11	.12	.11	.15	.11	.14
Acetic Anhydride, drs.....lb.	.13	.14½	.11½	.14½	.11½	.13
Acetone, tks, delv.....lb.	.07	.09	.07	.10	.06	.07
ACIDS						
Acetic, 28% bbls.....100 lbs.	3.78	4.08	3.38	4.08	3.38	3.63
Glacial, bbls.....100 lbs.	10.65	10.90	9.15	10.90	9.15	9.40
drs, wks.....100 lbs.	13.20	13.75	6.93	13.75	6.93	7.25
Acetylsalicylic, Standard USP.....lb.	.45	.59	.45	.59	.40	.59
Benzoic, tech, bbls.....lb.	.43	.47	.43	.47	.43	.47
USP, bbls., 4,000 lbs. up..lb.	....	.54	....	.54	....	.54
Boric tech, bbls, c-l.....tons *a*	....	137.50	....	137.50	....	109.00
Chlorosulfonic, drs, wks.....lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls.....lb. *b*	.22	.23	.20	.23	.20	.21
Cresylic 50%, 210-215° HB, drs, wks, frt, equal.....gal.	....	1.26	1.01	1.26	.81	1.04
Formic, 85%-90% cbys.....lb.	.12	.14½	.10	.14½	.10	.13
Hydrofluoric, 30% rubber, drs. .....lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls, wks..lb.	.44	.48	.039	.0415	.039	.0415
44%, light, bbls, wks.....lb.	.815	.855	.073	.855	.073	.0755
Maleic, Anhydride, drs.....lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys.....100 lbs.	1.50	2.90	1.50	2.90	1.50	2.45
20° cbys, c-l, wks.....100 lbs.	1.85	2.00	1.85	2.00	....	1.75
22° cbys, c-l, wks. .....100 lbs.	2.35	2.50	2.35	2.50	....	6.00
Nitric, 36°, cbys, wks..100 lbs. *c*	5.00	6.30	5.00	6.30	5.00	5.25
38°, c-l, cbys, wks...100 lbs. *c*	2.35	5.50	....	5.50	....	5.50
40°, c-l, cbys, wks...100 lbs. *c*	6.00	6.50	....	6.50	....	6.00
42°, c-l, cbys, wks...100 lbs. *c*	6.50	7.00	....	7.00	....	6.50
Oxalic, bbls, wks.....lb.	.13	.14	.11¾	.14	.11¾	.14½
Phosphoric, 100 lb. cbys, USP.....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls.....lb.	.31	.38	.26	.42	.26	.42
Sulfuric, 60°, tks, wks.....ton	13.00	13.50	....	13.50	....	13.00
66°, tks, wks.....ton	16.50	17.50	....	17.50	....	16.50
Fuming 20% tks, wks....ton	19.50	20.50	....	20.50	....	19.50
Tartaric, USP, bbls.....lb.	.49½	.50	.49½	.55	.54½	.71
Alcohol, Amyl (from Pentane) tks, delv.....lb.	....	.151	....	.151	....	.131
Butyl, normal, syn, tks...lb.	....	.16½	....	.16½	....	.14½
Denatured, CD 14, c-l drs.....gal. *d*	....	1.04½	....	1.06	....	.90
Denatured, SD, No. 1, tks. *d*	....	.98	....	.98½	....	.82½
Ethyl, 190 proof tks.....gal.	....	18.08	....	18.08	....	17.94
Isobutyl, ref'd, drs.....lb.	....	.13	....	.13	....	.0860
Isopropyl ref'd, 91%, dms.....gal.	.44	.47½	.41	.50½	.38	.47
Alum, ammonia, lump, bbls, wks.....100 lbs.	....	4.25	....	4.25	....	4.25
Aluminum, 98.99%.....100 lbs.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd, l.c.l. wks..lb.	....	.10¼	....	.10¼	.09	.12
Hydrate, light, bgs.....lb.	....	.17	....	.17	....	.14½
Sulfate, com'l. bgs, wks, c-l.....100 lbs.	1.15	1.30	1.15	1.30	1.15	1.25
Sulfate, iron-free, bgs, wks .....100 lbs.	1.95	2.25	1.75	2.50	1.75	2.00
Ammonia anyhd, cyl.....lb.	.16	....	.14½	.20	....	.14½
Ammonia, anhyd, fert, tank cars, wks, frt. equalized...ton	....	59.00	....	59.00	....	59.00
Ammonium Carbonate, USP, lumps, drs.....lb.	.08¼	.13½	.08¼	.13½	.08¼	.09½
Chloride, whi, bbls, wks, 100lbs.	4.75	5.00	4.45	5.15	4.45	5.15
Nitrate, tech, bgs, wks....lb.	.0435	.0450	.0435	.0450	.0435	.0850
Oxalate pure, grn, bbls....lb.	....	.23	....	.23	....	.23
Perchlorate, kgs.....lb.	.25			.25	no stocks	
Phosphate, dibasic tech, bgs.....lb.	.07	.07¾	.07	.07¾	.07	.07¾
Stearate, anhyd, drs.....lb.	....	.34	....	.34	....	.34
Sulfate, drs, bulk.....ton	30.00	35.00	30.00	35.00	28.20	30.00
Amyl Acetate (from pentane) tks, delv.....lb.	....	.2	....	.21	....	.181
Aniline, Oil, drs.....lb.	.13	.14	.12	.14	.11½	.13
Anthraquinone, sub, bbls....lb.	....	.70	....	.70	....	.70
Antimony Oxide, bgs.....lb.	.26	.27½	.21	.31	.15	.21¾
Arsenic, whi, bbls, powd....lb.	.06	.08	.05	.08	.04	.05¾

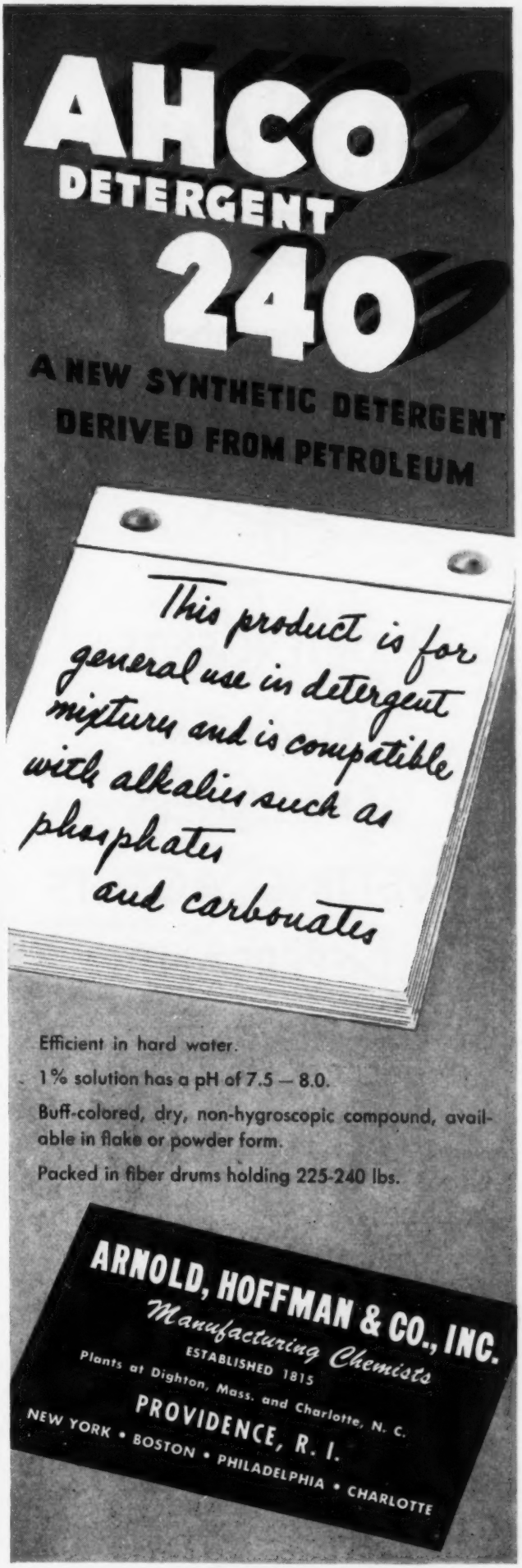
USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher; *c* Yellow grades 25c per 100 lbs. less in each case; *d* Prices given are Eastern schedule.

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Barium Carbonate precip, wks, bgs.....ton	67.50	82.00	60.00	82.00	60.00	75.00
Chloride, tech, cryst, bgs, zone 1.....ton	85.00	95.00	73.00	95.00	73.00	78.00
Barytes, floated, paper bgs..ton	no prices		....	41.95	....	41.95
Bauxite, bulk mines.....ton	8.50	10.00	7.00	10.00	7.00	10.00
Benzaldehyde, tech, cbys, drs..lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, frt all'd.....gal.	....	.19	....	.19	....	.17
Benzyl Chloride, cbys.....lb.	.20	.28	.20	.28	.20	.24
Beta-Naphthol, tech, bbls, wks.....lb.	.23	.29	.21	.29	.21	.24
Bismuth metal, ton lots.....lb.	....	2.00	....	2.00	1.25	1.80
Blanc Fixe, 66⅔% Pulp, bbls, wks.....ton h	55.00	60.00	40.00	60.00	40.00	46.50
Bleaching Powder, wks. 100 lbs.	2.75	3.75	2.50	3.75	2.50	3.60
Borax, tech, c-l, bgs.....ton i	53.50	56.00	45.00	56.00	....	45.00
Bordeaux Mixture, bgs.....lb.	.15	.23	.11	.23	.11	.11½
Bromine, cases.....lb.	.21	.23	.21	.23	.21	.23
Butyl, acetate, norm. drs....lb.	.30½	.31½	.26	.33½	.1860	.26½
Cadmium Metal.....lb.	1.75	1.80	....	1.80	.90	1.55
Calcium, Acetate, bgs..100 lbs.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs.....ton	50.00	90.00	50.00	90.00	50.00	90.00
Chloride, flake, bgs, c-l...ton	21.50	38.00	18.50	38.00	18.50	38.00
Solid, 73-75% drs, c-l....ton	21.00	37.50	18.00	37.50	18.00	37.50
Cy'n'd, min. 21% N, c.l...lb.	.02¼	.02¾	.02¼	.02¾	....	....
Gluconate, USP, bbls.....lb.	.58	.65	.57	.65	.57	.59
Phosphate tri, bbls, c-l...lb.	....	.0635	....	.0635	....	.0635
Camphor, USP, gran, powd, bbls.....lb.	.72	.78	.75	.82	.69	.82
Carbon Bisulfide, 55-gal. drs..lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl.....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drs.....lb.	.06½	.07	.06	.07	.69	.80
Casein, Acid Precip, bgs, 10,000 lbs. or more.....lb.	.32	.34	.26	.35	.24	.33
Chlorine, cyls, lcl, wks, contract.....lb.	.09	.10½	.08¾	.10½	....	.07¼
cyls, c-l, contract.....lb. f	....	.06¾	....	.06¾	....	.05¼
Liq. tk, wks, contract: 100 lbs.	....	2.00	....	2.30	....	2.30
Chloroform, tech, drs.....lb.	.20	.23	.20	.23	.20	.23
Coal tar, wks, crude..... .bbl.	9.50	10.00	8.25	10.00	8.25	9.00
Cobalt, Acetate, bbl.....lb.	....	.83¾	....	.83¾	....	.83¾
Oxide, black kgs.....lb.	1.275	1.30	....	1.30	....	1.84
Copper, metal.....100 lbs.	....	21.50	21.50	24.00	12.00	14.75
Carbonate, 52-54%, bbls..lb.	.24	.26	.19½	.26½	.19½	.20½
Sulfate, bgs, wks cryst. .....100 lbs.	7.60	8.00	7.10	8.60	5.00	7.25
Copperas, bulk, c-l, wks....ton	....	14.00	....	14.00	....	14.00
Cresol, USP, drs.....lbs.	.14	.15¾	.13¾	.15¾	.10¾	.14¼
Dibutylamine, c-l, drs, wks..lb.	....	.76	....	.76	....	.66
Dibutylphthalate, drs.....lb.	.32	.34½	.29	.34½	.17	.29½
Diethylaniline, drs.....lb.	....	.48	....	.48	....	.48
Diethyleneglycol, drs, wks...lb.	.14	.15	.14	.15	.14	.15
Dimethylaniline, drs, cl., lcl..lb.	.21	.24¼	.20	.24¼	.21	.22
Dimethylphthalate, drs.....lb.	.23½	.24¾	.20	.24¾	.20	.20½
Dinitrobenzene bbls.....lb.	....	.16	....	.16	....	.18
Dinitrochlorobenzene, dms..lb.	.14	.15½	14	.15½	....	.14
Dinitrophenol, bbls.....lb.	....	.22	....	.22	....	.22
Dinitrotoluene, drs.....lb.	....	.18	....	.18	....	.18
Diphenyl, bbls, lcl, wks.....lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls.....lb.	....	.25	....	.25	....	.25
Diphenylguanidine, drs.....lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, syn. 85-90% tks, frt. all'd.....lb.	....	.09½	....	.09½	....	.09½
Chloride, USP, bbls.....lb.	.20	.22	.18	.22	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, drs.....lb.	.09	....	.0891	.0950	.0842	.0941
Gylcol, dms, cl.....lb.	....	.12	....	.12	....	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines.....ton	....	37.00	....	37.00	....	37.00
Formaldehyde, bbls, cl & lcl..lb.	.0645	.0745	.0520	.0745	.0520	.0570
Furfural tech, tks.....lb.	....	.09½	....	.13	....	.13
Fusel Oil, ref'd, drs, dlvd....lb.	.26½	.27½	.18½	.27½	.18½	.19½
Glauber's Salt, Cryst, bgs, wks..... 100 lbs.	1.25	1.75	1.05	1.75	1.05	1.45
Glycerine dynamite, drs, c-l..lb.	....	.29½	.29½	.75¾	.17½	.55¼
Crude Saponification, 88% to refiners tks.....lbs.	.23	.24	.23	.60	....	.60

GUMS

Gum Arabic, amber sorts bgs.lb.	.14	.14½	.13¾	.15	.11¾	.14½
Benzoin, Sumatra, cs.....lb.	.55	.60	.60	1.00	.52	1.70
Copal, Congo.....lb.	no prices		....	no prices	....	.55¾
Copal, East India, chips....lb.	no prices		....	no prices	....	.55¾
Macassar dust.....lb.	no prices		....	no prices	....	.07⅜
Copal Manila.....lb.	no prices		.25	....	.13½	.25
Copal Pontianak.....lb.	no prices		....	no prices	....	.17⅜
Karaya, bbls, bxs, drs.....lb.	.20	.51	.20	.55	.18	.50

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.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	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Shellac, blchd. bone dry, bbls.....lb.	.58½	.59	.65	.74½	.42½	.74½
Silver Nitrate, bots, 2,500-oz. lots.....oz.	.42¼	.45½	.42¼	.59	.47	.59
Soda Ash, 58% dense, bgs, c-l, wks.....100 lbs.	....	1.28	....	1.28		1.28
58% light, bgs cl.....100 lbs.	....	....	....	1.30	1.05	1.20
Caustic, 76% flake drs, cl.....100 lbs.	....	3.00	2.90	3.00	....	3.00
76% solid, drs, cl...100 lbs.	....	2.60	2.50	2.75	....	2.75
Liquid, 47-49%, sellers, tks.....100 lbs.	....	2.10	....	2.10	....	2.10
Sodium Acetate, anhyd. drs.....lb.	.06½	.10	.06½	.10	.08½	.10
Benzoate, USP drs.....lb.	.46	.52	.46	.52	.46	.52
Bicarb, USP, gran., bgs., cl., works.....100 lbs.	..	2.25	2.25	2.59	1.55	2.59
Bichromate, bgs, wks l.c.l..lb.	.08¾	.08⅞	.07⅞	.08⅞	.07⅞	.08⅛
Bisulfate powd, bbls, wks.....100 lbs.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls., wks.....100 lbs.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l.....lb.	....	.06¼	....	.06½	....	.06¼
Cyanide, 96-98%, drs.....lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, drs...lb.	.09¾	.10	.07¾	.10	.07¾	.08¼
Hyposulfite, cryst, bgs, cl, wks.....100 lbs.	....	2.75	....	2.75	....	2.25
Metasilicate, gran, bbl, wks c-l.....100 lbs.	....	3.40	....	3.40	....	3.40
Nitrate, imp, bgs.....ton	....	42.50	....	42.50	33.00	38.50
Nitrite, 96-98% bbl. cl.....lb.	....	.06¾	....	.06¾	....	.06¾
Phosphate, dianhyd. bgs, wks.....100 lbs.	6.25	7.00	6.00	7.00	6.00	6.75
Tri-bgs, cryst, wks.100 lbs.	3.50	3.90	2.70	3.90	2.70	3.10
Prussiate, yel. bbls, wks...lb.	....	.12¼	....	.12¼	..	.11
Silicate, 52°, drs, wks..100 lbs.	1.55	2.00	1.40	2.00	1.40	1.80
40°, drs, wks, c-l...100 lbs.	.95	1.15	....	1.15	....	.80
Silicofluoride, bbls, NY...lb.	.07½	.08½	.06½	.08½	.06½	.10
Sulfate tech, Anhyd, bgs.....100 lbs.	2.10	2.60	1.70	2.60	1.70	2.20
Sulfide, cryst c-l, bbls, wks.....100 lbs.	....	3.25	....	3.00	....	2.40
Solid, bbls, wks.....lb.	3.50	5.50	3.05	5.50	3.15	3.90
Starch, Corn, Pearl, bgs.100 lbs.	6.37	7.17	4.99	7.17	4.321	6.271
Potato, bgs, cl.....lb.	....	.08¾	.0735	.09	.0735	.0760
Rice, bgs.....lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs.....lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines.....ton	16.00	18.00	16.00	18.00	....	16.00
Flour, USP, precp, bbls, kgs.....lb.	.18	.30	.18	.36	.18	.36
Roll, bbls.....100 lbs.	2.65	3.40	2.65	3.40	2.40	3.40
Sulfur Dioxide, liquid, cyl...lb.	....	.085	.07	.095	.07	.08
tks, wks.....lb.	....	.044	....	.044	....	.04
Talc, crude, c-l, NY.....ton	....	15.00	....	15.50	....	15.50
Ref'd, c-l, NY.....ton	14.50	24.50	14.50	24.50	13.00	21.00
Tin, crystals, bbls, wks.....lb.	.55	.60	....	.60	no stocks	
Metal.....lb.	....	.80	....	.80	....	.70
Toluol, drs, wks.....gal.	..	.28	....	.28	.27	.32
tks, frt all'd.....gal.	..	.23	....	.23	.22	.27
Tributyl Phosphate, drs, lcl. frt all'd.....lb.	.68	.72	....	.72	....	.65
Trichloroethylene, drs, wks..lb.	.09¼	.10½	.08	.10½	.08	.09
Tricresyl phosphate tks.....lb.	....	.32	..	.32	....	.32
Triethylene glycol, drs.....lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos., bbls.....lb.	.26	.27	.26	.32	.26	.32
Urea, pure, cases.....lb.	....	.12	....	.12	....	.12
Wax, Bayberry, bgs.....lb.	no stocks		no stocks		no stocks	
Bees, bleached, U.S.P. cakes.lb.	.65	.70	.68	.72	.60	.70
Candelilla, bgs, crude.....lb.	.63	.65	.63	.80	.62	.86
Carnauba No. 1, yellow, bgs, ton.....lb.	1.30	1.33	1.30	2.00	1.80	2.04
Xylol, Indus., frt all'd, tks wks.....gal.	.23	.25	....	.23	...	.26
Zinc Chloride tech, fused, wks.....lb.	.06¼	.0655	.05	.0655	.05	.0535
Oxide, Amer., bgs, wks....lb.	.095	.0975	.09	.09¾	.07	.09¼
Sulfate, crys, bgs....100 lbs.	4.15	4.90	3.40	4.90	3.40	4.15

OILS AND FATS

Babassu, tks.....lb.	....	....	.15	...	.11	.12
Castor, No. 3, drs, c.l.....lb.	.27¾	.34¼	.27¾	.34¾	....	.29¾
China Wood, drs, spot NY.:lb.	.25¾	.27	.24	.41	.39	.41
Coconut, edible, drs NY...lb.	no prices		no prices			.0985
Cod, USP, bbls, drs.....gal.	2.40	3.50	2.40	3.80	2.15	3.80
Corn, crude, tks, wks.....lb.	.18	.22½	.18	.37	....	.27
Linseed, Raw, drs, c.l.....lb.	.3040	nom.	.334	.3960	.1680	.3640
Menhaden, crude tks.....lb.	no prices		.23	nom.	.1220	.21½
Light, pressed, drs l.c.l...lb.	.16	.19	.16	.29	.1300	.29
Palm, Niger, dms.....lb.	no prices		no prices		....	.0865
Peanut, crude, tks, f.o.b. wks.lb.	.17	nom	.20	.37	.12⅞	.28½
Perilla, crude, dms, NY.....lb.	no stocks		no stocks		no stocks	
Rapeseed, bulks.....lb.	no prices		....no prices		....	.13
Red, dms.....lb.	.17¾	.21¼	.17¾	.33¾	.13¾	.30¾
Soy Bean, crude, tks, wks...lb.	.15½	.16	.15¼	.33	.1175	.2450
Tallow, acidless, dms.....lb.	.19½	nom	.19½	.34½	....	.14¼

Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y., refined 6c higher in each case.

Current Prices

Gums
Saltpeter

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Kauri, N. Y.						
Superior Pale XXX ..... lb.	no prices		....	nom.	....	.65¾
No. 3 ..... lb.	no prices		....	nom.	....	.22
Sandarac, cks. ..... lb.	no prices		.85	.95	.90	.99½
Tragacanth, No. 1, cases .... lb.	3.75	3.80	3.75	5.25	3.75	5.25
No. 3 ..... lb.	2.00	2.10	2.10	3.45	2.10	3.45
Yacca, bgs ..... lb.	no prices		....	nom.	.05	.07¾
Hydrogen Peroxide, cbys .... lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars .... lb.	2.35	2.65	....	2.65	1.75	2.10
Lead Acetate, cryst, bbls .... lb.	....	.19¼	....	.19¼	....	.16¾
Arsenate basic, bg, lcl ..... lb.	.22¾	.23¾	....	.23¾	.12	.18
Nitrate, bbls ..... lb.	.17¾	.18	....	.18	....	.12½
Red, dry, 95% Pb_3O_4 bbls ..... lb.	.178	.18½	.14¼	.19¼	.09	.16
97% Pb_3O_4, bbls delv ... lb.	.1785	.18¾	.15	.19½	.09½	.16¾
98% Pb_3O_4, bbls delv ... lb.	.1810	.19	.15¼	.19¾	.08¾	.17
White, bbls ..... lb.	.16	.16¼	.13	.17¾	.07¼	.14¼
Basic sulfate, bbls, lcl ... lb.	.15¼	.15½	.12½	.15½	.07¼	.13¼
Lime, Chem., wks, bulk ..... ton	6.50	10.25	6.50	10.25	6.50	10.25
Hydrated, f.o.b. wks .... ton	8.00	12.14	8.00	12.14	8.50	12.00
Litharge, coml, delv. bbls .... lb.	.1660	.17½	.13	.17½	.08	.15¼
Lithopone, ordi., bgs. .... lb.	.05½	.06	.03	.06	.04¼	.05¼
Magnesium Carb, tech, wks.. lb.	.07¼	.10¾	.07¼	.10¾	.07¼	.10¾
Chloride flake, bbls, wks c-l ..... ton	....	37.00	....	37.00	....	32.00
Manganese Chloride, Anhyd. bbls ..... lb.	.14	.16	.14	.16	.14	.18
Dioxide, Caucasian bgs, lcl ..... ton	74.75	79.75	74.75	79.75	74.75	79.75
Methanol, pure, nat, drs .. gal. *l*	.63	.73	.63	.73	.63	.73
Synth, drs cl ..... gal. *m*	.34½	.41½	.31	.41½	.24	.38
Methyl Acetate, tech tks .... lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv .. lb.	.09½	.10½	.09½	.10½	.09½	110½
Chloride, cyl ..... lb.	.33	.41	.32	.41	.32	.40
Ethyl Ketone, tks, frt all'd. lb.	....	.09	....	.09	....	.09
Naphtha, Solvent, tks. .... gal.	....	.28	....	.28	....	.27
Naphthalene, crude, 74°, wks. tks ..... lb.	.035	.0475	.035	.083	.0275	.035
Nickel Salt, bbls, NY ..... lb.	.14	.14½	.14	.14½	.13	.14½
Nitre Cake, blk ..... ton	20.00	24.00	....	24.00	....	16.00
Nitrobenzene, drs, wks ..... lb.	.08½	.10	.08	.09½	.08	.09
Orthoanisidine, bbls ..... lb.	....	.70	....	.70	....	.70
Orthochlorophenol, drs ..... lb.	....	.37	.25	.37	.25	.27
Orthodichlorobenzene, drs... lb.	.07½	.10½	.07	.10½	.07	.08
Orthonitrochlorobenzene, wks ..... lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, drs .. lb.	.08	.09	.08	.09	....	.09
Paraldehyde, 98%, wks lcl ... lb.	....	.13	....	.13	....	.12
Chlorophenol, drs ..... lb.	.25	.29	.24	.29	.24	.27
Dichlorobenzene, wks ..... lb.	.12½	.14	.12½	.14	.11	.17
Formaldehyde, drs, wks ... lb.	.21	.22	....	.22	.21	.22
Nitroaniline, wks, kgs .... lb.	.41	.43	.41	.43	.41	.45
Nitrochlorobenzene, wks .. lb.	....	.15	....	.18	....	.18
Toluenesulfonamide, bbls .. lb.	....	.70	....	.70	....	.70
Toluidine, bbls, wks ... lb.	.44	.53	....	.53	....	.48
Penicillin, ampules per 100,000 units, bulk	....	.19	....	.38	.38	.95
Pentaerythritol, tech. .... lb.	.32	.36	.27	.36	.27	.41

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast ..... gal.	.13	.13½	....	.13	.11½	.12½
Naphtha, East tks, wks ..... gal.	.11	.11½	....	.11	.11	.12
Rubber solvents, East, tks, wks ..... gal.	.12½	.13	....	.12	.11	.12
Stoddard Solvents, East, tks, wks ..... gal.	.11½	.12	....	.12	.10	.12

Phenol, U.S.P., drs ..... lb.	.11¼	.13¼	.11¼	.13¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks ..... lb.	.14½	.18½	.14½	.15½	.13	.15½
Potash, Caustics, 88-92%, wks, sol ..... lb.	.06¾	.07½	.06¼	.07½	.06¼	.06¾
Flake, 88-92% ..... lb.	.07½	.08¼	.07	.08¼	.07	.07½
liquid, 45% basis, tks ... lb.	....	.03½	....	.03½	....	.02½
drs, wks ..... lb.	.0337½	.0375	.03¼	.04	.03	.03½
Carbonate, hydrated 83-85%, bbls ..... lb.	....	.05¾	....	.05¾	....	.05½
Chlorate crys, kgs, wks ... lb.	.08½	.09¾	.08½	.13	.11	.13
Chloride, crys, tech, bgs, kgs ..... lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks ..... lb.	....	.55	....	.55	....	.55
Iodide, drs ..... lb.	1.95	1.98	1.44	1.98	1.44	1.48
Muriate dom, 60-62-63% K_2O bulk unit-ton	....	.53½	....	.53½	.53½	.56½
Permanganate, USP, wks drs ..... lb.	.22½	.23	.20½	.23	.20½	.21
Sulfate, 90%, basis, bgs .. ton	36.25	39.25	36.25	39.25	36.25	39.25
Propane, group 3, tks. .... gal.	....	.03½	....	.03¾	....	.03¾
Pyridine, ref., drs ..... lb.	.60	.65	.55	.65	.45	.55½
R Salt, 250 lb. bbls, wks .... lb.	.61	.72	....	.72	....	.65
Resorcinol, tech, drs, wks ... lb.	....	.68	.64	.74	.64	.74
Rochelle Salt, cryst ..... lb.	.34½	.35	.34½	.35	.34½	.47
Salt Cake, dom, blk wks ... ton	20.00	26.00	....	26.00	....	15.00
Saltpeter, grn. bbls .... 100 lbs.	8.00	9.50	8.20	9.50	8.20	9.00

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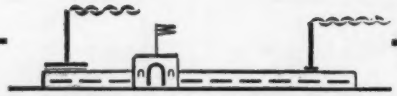

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The substantial increase in production, plus the trend of foreign as well as domestic consumption and the desirability of maintaining incentives to continued expansion, led the Department of Commerce to establish an export quota of 300,000 grams for August. Authorized export quota for July was 125,000 grams.

Lead Output Declines

Lead production from United States mines dropped 9 percent in July and was the smallest since December 1946, according to the Bureau of Mines. Western States, output fell 10 percent and Central States' 7 percent, the former virtually duplicating production in February (indicating a smaller daily average for July, however) whereas the latter was smaller than in any other month since October 1946.

In all the important lead-producing States declines were noted; Utah led with a drop of 26 percent, Colorado fell 8 percent, Idaho 6 and Arizona 5.

Fertilizer Exports Up; Imports Down

Exports of fertilizers and fertilizer materials for the fiscal year ended June 30, 1947 amounted to 1,392,000 short tons with a value of $27,505,000. Compared with the two preceding fiscal years, exports were 7 percent greater than the 1,306,000 tons reported for 1945-46, and 82 percent greater than the 764,000 tons shipped during 1944-45.

During the recently completed fiscal year, exports of phosphate rock, amounting to 788,000 tons, comprised 57 percent of total exports, compared with 54 percent and 55 percent respectively in the 1945-46 and 1944-45 fiscal years. Exports of nitrogenous materials, amounting to 15 percent of total exports, increased 5 percent over July-June 1945-46, while shipments of potash materials, amounting to 7 percent of total exports, were 4 percent below the 106,000 tons shipped during July-June 1945-46.

Imports of fertilizers and fertilizer materials for the fiscal year ended this past June 30 amounted to 1,193,000 short tons, with a value of $40,684,000. Compared with the 1,352,000 tons imported during 1945-46, imports were 12 percent lower, and compared with 1944-45 they were 33 percent lower. Although the import tonnage of the past fiscal year was noticeably below that of the 1945-46 period, the total was 8 percent greater.

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Atlanta, Georgia — TENNESSEE CORPORATION — Lockland, Ohio

"WE"— EDITORIALLY SPEAKING

THE RUSSIANS, we learn from a recent issue of *Time*, are still trying to paste ideological labels on science. (We commented on this, you may recall, some months ago.)

Now Anton R. Zhebrak, who has dared to attack Ideological Pet Lysenko, is accused of seeing no difference between Soviet and non-Soviet science. "Zhebrak as a Soviet scientist should have unmasked the class meaning of the struggle which is taking place around questions of genetics. But blinded by bourgeois prejudices, by detestable fawning on bourgeois science, he has adopted the attitude of the enemy's camp. . . . It turns out that there is a so-called pure science for Zhebrak. . . . It appears that there is no progressive Soviet biological science; there is no reactionary idealistic biology in the world. . . . How unsightly is the role of Zhebrak!"

We were going to mention that the boiling point of ethanol at atmospheric pressure is 78.4°C., but we're afraid we might be accused of bourgeois, anti-Marxist propaganda.

IN SOVIET GENETICS the American eagle is probably descended from a long line of greedy capitalist vultures.

WHAT IS THE WORLD coming to? Now there's a green toothpaste (containing chlorophyll) on the market and a red one—to tint your gums to match your lipstick.

Our Christmas-tree-decorating problem is solved: We'll just drape green and red ribbons on the branches.

AFTER ATTENDING SEVERAL BANQUETS last month in connection with the ACS meeting, we turn slightly green at the thought of chicken. If all the chickens served that week had been laid end to end—six feet under— we, for one, wouldn't have shed a tear.

WE CAN STAND the word "hydrogenation". It's five syllables long, but it's hard to think of a shorter word that means the same thing.

But we do think that one company is going too far when it says in a stock prospectus that it carries out "hydrogenization". Just what does the extra syllable accomplish—except add a fraction of a mill to the typesetter's pay? Or is it some terrific new process, say a combination of hydrogenation and homogenization?

ONE GOOD THING about the old-fashioned soap bubble, it eventually bursts and disappears. Then came bubble gum, which also bursts but makes everything it touches sticky. Now, horror of horrors, we have the vinyl bubble—indestructible, tough as an old shoe, permanent.

We were walking down West Eighth St. the other evening when one floated gently down from an apartment window and landed unharmed in the gutter. Soon we won't be able to walk on the sidewalks of New York for getting tangled in vinyl plastic.

FIFTEEN YEARS AGO

(From Our Files of October, 1932)

To the military occupation of Manchuria Japan has added a chemical invasion of several important markets, and the same economic pressure is pleaded in both operations.

Synthetic sodium nitrate production in Germany may exceed 200,000 tons this year, almost 150,000 tons having been exported, mainly to France, in the first half of 1932.

"Get the government out of competition with private business" is the new theme song of the National Association of Manufacturers.

In Germany new import duties were placed in effect Sept. 6 to "further moderate regulation of imports," according to a statement of the German Chancellor. As yet the specific changes have not been disclosed.

THIRTY YEARS AGO

(From Our Files of October, 1917)

Union Carbide & Carbon is formed by merger of Union Carbide, National Carbon, Prest-O-Lite, and Linde Air Products.

Crude muriate of potash, as potash supplies become scarce, is quoted at $400 a ton compared with $40 in 1914.

Government commandeers 7,000 tons of caustic soda for war purposes.

H. Gardner McKerrow suggests formation of a national association of dyestuffs manufacturers.

Kuttroff, Pickhardt & Co. of Manhattan, drugs, chemicals, etc., incorporated at $200,000.

"A salesman selling caustic soda? Well don't just stand there, Joe—throw him in!"

ONE OF OUR CORRESPONDENTS reports that chemical process equipment was "damned back" as a result of the war. We're not surprised. Some of the chemical engineers we know are superlatively eloquent at times.

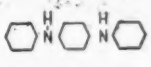
WE LEARNED upon looking over our "Fifteen Years Ago" issue that "the Soviet Institute of Applied Chemistry is reported to have perfected a new synthetic process for cyanide manufacture. A commercial plant is now planned."

Let's see, that was just a couple of years before the Big Purge, wasn't it?

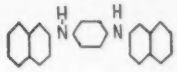
THOSE OF US who attended the Alpha Chi Sigma dinner at the ACS meeting came home laden with loot: vitamin tablets, dish-washing detergent, insect repellent, matches, a plastic shot glass and some cracker crisper. Speaker of the evening, Monsanto's Frank Curtis, did even better: His ticket, drawn out of a hat, won him a bottle of Old Forester.

It would seem that the bottle would be more appropriately given to someone from the Forest Products Laboratory, "wooden" it?

Di-secondary Aromatic Amines



Diphenyl p-Phenylenediamine

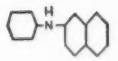


Di B-Naphthyl p-Phenylenediamine

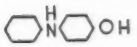
These chemicals are suggested for use as stabilizers, anti-oxidants, polymerization inhibitors, and for organic synthesis. It is believed that they will be of interest to technical men in the following industries: dye, explosives, drug, medicinals, petroleum, plastics, and photographic.

Other organic chemicals

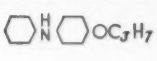
Secondary Aromatic Amines



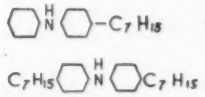
Phenyl B-Naphthylamine



p-Hydroxy Diphenylamine



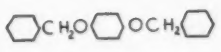
p-Isopropoxy Diphenylamine



Mixed Mono and Diheptyl Diphenylamines

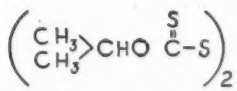
Ethers of Hydroquinone

Monobenzyl Ether of Hydroquinone

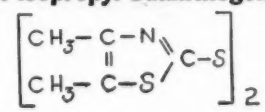


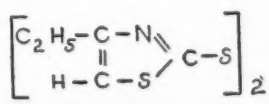
Dibenzyl Ether of Hydroquinone

Miscellaneous

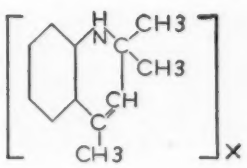


Di-Isopropyl Dixanthogen

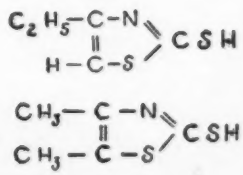




Mixed Aliphatic Thiazyl Disulfides



Trimethyl Dihydro Quinoline Polymer



Mixed Ethyl and Dimethyl Mercaptothiazoles

N-Nitroso Diphenylamine

All materials listed here are available in commercial quantities. Prices and technical information are available on request. Please write Dept. CE-10, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

B. F. Goodrich Chemical Company

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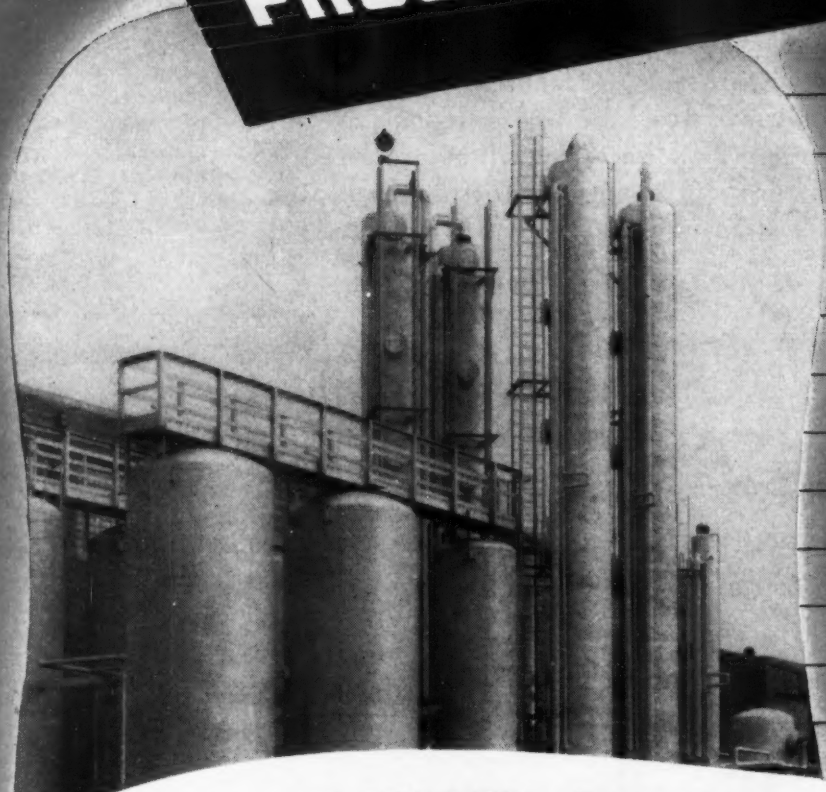
Devine
PROCESS EQUIPMENT



- Pressure Vessels
- Vacuum Vessels
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- Digesters
- Autoclaves
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- Dryers
- Carbonators
- Evaporators
- Stills
- Condensers

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Abstracts of U. S. and Foreign Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of U. S. patents are available from the Patent Office at 25 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

Requests for further information or photostated copies of Canadian patents should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

U. S. Patents from Official Gazette—Vol. 599, Nos. 1, 2, 3, 4 (June 3-June 24)
Canadian Patents Granted and Published July 29-August 19, 1947.

*Food

Preserving peeled white potatoes and preventing discoloration comprising coating peeled potatoes throughout exposed peeled portions with aqueous cooled solution having SO_2 in concentration of about .5 to 6.0%, enclosing coated potatoes in closed container, under refrigeration. No. 2,420,322. Ralph F. Matarazzo.

Drying structured foods with high water content comprises contacting food with dehydrating solution of successively increasing concentrations of non-toxic organic hydrophilic substance. No. 2,420,517. John D. Brandner and Rudolph Max Goepp, Jr. to Atlas Powder Company.

Conditioning malt sprouts for use in bakeries comprising pulverizing malt sprouts treating pulverized sprouts at least once with ether 15 minutes for extracting sprouts. No. 2,420,567. Roland W. Selman, Jr. and Homer S. Myers to Campbell-Taggart Research Corporation.

Extracting peel oil from whole citrus fruit with high pressure. No. 2,420,678. Wilbur A. Pipkin.

Manufacture of crystalline riboflavin, process comprises treating with polar solvent amorphous reddish-brown reduction product of riboflavin, which has property of dissolving in water and other polar solvents in absence of air to form green solution turning yellow upon oxidation due to conversion of reduction product into riboflavin, etc. No. 2,421,142. Julian K. Dale to Commercial Solvents Corporation.

Conditioning fatty acid stock to enable crystal fractions having good filtering characteristics to be precipitated from solvent solution of stock cooled to predetermined temperature. No. 2,421,157. Latimer D. Myers and Victor J. Muckerheide, to Emery Industries, Inc.

Canadian

The process of forming crystalline sodium glutamate. No. 442,652. A. E. Staley Manufacturing Company (Paul R. Shildneck).

*Inorganic

Producing chromic acid and calcium chromate comprises evaporating portion of water of aqueous solution of calcium dichromate with concomitant decomposition of calcium dichromate and production of chromic acid in liquid condition and precipitate consisting of calcium chromate separating chromic acid and calcium chromate. No. 2,420,532. Alan R. Fraser to Chromium Mining & Smelting Corporation, Ltd.

In production of thionyl chloride steps comprising passing sulfur trioxide and chlorine at rate of 1.5 to 2 mols of sulfur trioxide to each mol of chlorine into heel of liquid sulfur monochloride which contains about 3 to 15 per cent of thionyl chloride, etc. No. 2,420,623. Walter H. Salzenberg and Michael Sveda to E. I. du Pont de Nemours & Company.

Manufacture of hydrogen chloride comprises dissolving aluminum chloride-hydrocarbon complex in organic solvent ratio of solvent to complex being at least two to one contacting solvent containing dissolved complex with aqueous hydrolyzing agent to form reaction mixture, separating reaction products, recovering anhydrous hydrogen chloride from reaction mixture. No. 2,420,909. Reuben F. Pfennig and Joseph T. Horeczy to Standard Oil Development Company.

Nitric acid as selective solvent in oxidation of naphthenes. No. 2,420,938. Thomas F. Doumani and Clarence S. Coe to Union Oil Company of California.

Making optical body comprising making ingot of volume in excess of one cubic centimeter consisting of single crystal of silver chloride and forming optical body of desired shape by deforming ingot. No. 2,420,955. Harry C. Kremers and Robert E. Price to The Harshaw Chemical Company.

Solid optical body composed of silver chloride and silver sulfide. No. 2,420,956. Harry C. Kremers and Robert E. Price to The Harshaw Chemical Company.

Synthesizing an amide from corresponding nitrile comprises contacting mixture of nitrile and water with solid contact catalyst selected from active silica, active alumina, and natural and synthetic active combinations of silica and alumina at elevated temperature and at pressure to maintain reactants in liquid phase. No. 2,421,030. John E. Mahan to Phillips Petroleum Company.

Synthesizing thioamide from corresponding nitrile comprises contacting mixture of nitrile and hydrogen sulfide with solid contact catalyst selected from active silica, active alumina and natural and synthetic active combinations of silica and alumina at elevated temperature and at pressure to maintain reactants in liquid phase. No. 2,421,031. John E. Mahan to Phillips Petroleum Company.

Preparing nitro amines. No. 2,421,165. Murray Senkus to Commercial Solvents Corporation.

Producing free-flowing dustless granular salt from free-flowing granular water-soluble salt containing fine material in form of dust comprises applying to particles of salt aqueous solution of water-soluble adhesive which will dry to adherent film. No. 2,421,185. Rock L. Comstock to Bay Chemical Company, Inc.

Making phosphor crystals consists in heating to its crystallizing temperature mixture of compound of metal selected from zinc, and cadmium and mixtures thereof and element selected from sulphur and selenium and mixtures thereof, activator for compound and flux for heated compound soluble in hot aqueous solution of compound of hydrogen and element, etc. No. 2,421,207. Humboldt W. Leverenz to Radio Corporation of America.

Applying fluoride phosphor to base comprises suspending above base fine particles of fluoride in saturated solution of magnesium sulphate in alcohol removing supernatant alcohol after phosphor particles have settled onto base, evaporating remaining alcohol to cause magnesium sulphate to bind phosphor particles together and to base. No. 2,421,208. Humboldt W. Leverenz to Radio Corporation of America.

Canadian

Making pure selenium dioxide, free of elemental selenium by gaseous oxidation of vaporized selenium in the presence of a catalyst. No. 442,576. Canadian Copper Refiners, Ltd. (Charles William Clark and Eugene Mitchell Elkin).

Making elemental selenium by reducing selenium dioxide with ammonia and thereafter selectively condensing. No. 442,577. Canadian Copper Refiners, Ltd. (Charles William Clark, Eugene Mitchell Elkin and George Raymond Waitkins)

Enriching acetylene by dissolving impure acetylene in dioxene and liberating enriched acetylene by freezing the dioxane. No. 442,580. Canadian Industries, Ltd. (William Henry Hamill and Richard Rockhill Vogt)

Process for the preduction of chloroacetonitriles by interacting chlorine and acetonitrile in the vapour phase. No. 442,583. Canadian Industries, Ltd. (James John Gray and Frank Burgess)

Preparing dihaloalkanes by heating 84 parts by weight of propylene with 96.5 parts of concentrated hydrochloric acid, 45 parts of formaldehyde, and 54 parts of hydrogen chloride, in a pressure-resistant reactor at 150° to 161°C. under a pressure of 200 atmospheres. No. 442,588. Canadian Industries, Ltd. (William Franklin Gresham)

Stabilizing sulphur trioxide by adding thionyl chloride in an amount from 2 to 15 per cent. No. 442,589. Canadian Industries, Ltd. (Carl Linden Rollinson).

Process for manufacture of boron trifluoride by reaction of boric acid and fluosulphonic acid. No. 442,606. General Chemical Company. (De Walt Secrist Young and John H. Pearson).

Production of pentaerythritol formaldiacetate by reacting pentaerythritol monoformal with acetic anhydride in the presence of sodium acetate as esterification catalyst. No. 442,808. Camille Dreyfus (George W. Seymour and Victor S. Salvin).

Composition of matter comprising cellulose acetate and as plasticizer therefor, pentaerythritol formaldipropionate. No. 442,809. Camille Dreyfus (George W. Seymour and Victor S. Salvin).

Method of dehydrating wet tar, oil or other liquids by passing a stream of the hydrated 90750—4½ fluid at atmospheric pressure about a series of heat exchange pipes. No. 442,927. Edward James Burrough.

Process for preparing alpha-beta-dichloro-meta-tolylethane. No. 442,977. The United Gas Improvement Company (Frank John Soday).

Process for preparing alpha-beta-dichloro-para-tolylethane. No. 442,978. The United Gas Improvement Company (Frank John Soday).

Process for purifying methyl styrene. No. 442,981. The United Gas Improvement Company (Claude Weaver Jordan).

Process of preparing keratin meal for use in moulding compositions, from natural animal products such as hoofs. No. 443,075. Hornflowa, Ltd. (Richard Neiger and Vaclav Nachazel).

As a new product, yellow basic lead styphnate in the form of tabular rectangular parallelopiped crystals. No. 442,942. Olin Industries, Inc. (Aaron L. Hitchens, Jr. and Frederick M. Garfield).

Preparing nitrogen trichloride by contacting gaseous chlorine with a solid ammonium salt in the presence of moisture. No. 443,068. General Mills, Inc. (William S. Hutchinson).

*Medicinal

Optically active tetrahydrodibenzopyrans having marihuana activity and process making. No. 2,419,934. Roger Adams.

Stabilized composition of matter comprising substance containing significant percentage of fats susceptible to oxidation and small, effective amount of mixture of crude source of vitamin B complex and monoether of hydroquinone selected from monomethyl and monobenzyl ethers. No. 2,420,238. Paul Gyorgy to Wyeth, Incorporated.

Steroidal hormone intermediates and preparation of same. No. 2,420,489. Russell Earl Marker to Parke, Davis & Company.

Process for preparing progesterone. No. 2,420,491. Russell Earl Marker and Elmer J. Lawson to Parke, Davis & Company.

Preparing di-Histidine and intermediates therefor. No. 2,420,641. Noel F. Albertson and Sydney Archer to Winthrop Chemical Company, Inc.

2-sulfanilamidopyrazine, formula described in patent. No. 2,420,703. Rudolph Conrad Ellingson to Mead Johnson & Company.

*Metals, Ores

Beneficiating iron ores by froth flotation of siliceous gangue constituents from iron oxides. No. 2,419,945. Julius Bruce Clemmer and Milton Friel Williams, Jr.

Treating mixtures containing sulfur and copper and nickel to obtain metals in crystalline sulfide from chemically free from other metal, comprises establishing molten mass consisting of copper, nickel and sulfur, subjecting molten mass to regulated slow cooling to below 960°F. to obtain mixture of crystals of copper sulfide chemically free from nickel and crystals of nickel sulfide chemically free from copper, etc. No. 2,419,973. William Kelvin Sproule and George Alan Harcourt to The International Nickel Company, Inc.

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* *U. S. Patents from Vol. 598, Nos. 1, 2, 3, 4.*
Canadian from July 1-July 22, 1947.

Method of hydraulic separation of mineral constituents of ground ores in finer sizes consists in subjecting disassociated constituents of ore to continuous even flow of mass of water free from separate current therein and under diffusion distribution moving upwards at low velocity regulated in relation to disassociated constituents of ore, etc. No. 2,420,180. William C. Laughlin.

Removing "fire" from heated silver-copper alloy articles comprising pickling articles with hot dip of dilute sulphuric acid to remove carbon, treating articles with nitric acid fire dip to oxidize off silver nitrate, leaving milky "film of fire", immersing articles at least once in aqueous solution containing when prepared hydrogen peroxide equivalent to 90-120 cc. of 10 per cent of hydrogen peroxide solution and one-half ounce sodium cyanide per gallon of water, etc. No. 2,420,262. Malio Navarretta.

Magnesium base casting alloy containing between 0.5 and 1.5% of cerium and between 4 and 8% of zinc, alloy being characterized by greater freedom from micro-shrinkage than magnesium base alloy of same composition but devoid of amount of cerium. No. 2,420,293. Adolf Beck, Gustave Siebel and Hugo Vosskuhler.

Brightening tinned strip comprises progressively moving strip longitudinally in predetermined path while progressively heating it until it attains 437°F., further heating it to temperature higher than melting point of tin coating but at slower rate per unit of travel, immediately cooling in a gaseous medium to first mentioned temperature, quenching in liquid quenching medium to temperature below first mentioned temperature. No. 2,420,377. Carl G. Jones.

In operation of blast furnace to reduce oxide ores to metal furnace having burden of iron ore coke and lime stone comprise reducing ore by bosh gases formed by combustion of coke in burden and hot blast of air, supplementing such reduction by introducing reducing gases free of CO_2 and H_2O and low as compared to air in nitrogen. No. 2,420,398. Selwyne P. Kinney to S. P. Kinney Engineers, Inc.

Obtaining smooth, fine-grained deposits of iron from electrolytic bath consisting of aqueous solution of salt from class consisting of ferrous chloride and ferrous sulfate. No. 2,420,403. William B. Stoddard, Jr., to The Champion Paper and Fibre Company.

Concentrating sylvite in form of mixture of finer and coarser particles from sylvinite ore by froth-flotation treatments. No. 2,420,476. Ernest W. Greene, Joe R. Sherertz and Allen T. Cole to Minerals Separation North American Corporation.

New article cuprous powder stable in air, highly reactive and providing source of available copper for various chemical purposes comprising finely divided cuprous powder, major portion of particles of which are few microns in size, having as principal constituent friable metallic copper core particles surrounded by protective surface films of cuprous oxide inhibiting oxidation in air. No. 2,420,540. Dean S. Hubbell to H. H. Robertson Company.

Producing iron-silicon alloy of more than 20% silicon in shaft furnace blown with preheated atmospheric air. No. 2,420,564. Percy H. Royster.

Removal of mineral oil from ferrous metal following cold-rolling of metal using oil as lubricant step comprising electrocleaning metal in silicate detergent solution. No. 2,420,602. Richard W. Kingerley, Jr., to E. I. du Pont de Nemours & Company.

Apparatus for charging kiln or the like with divided material. No. 2,420,653. Avery A. Clark to The Great Western Sugar Company.

Treating aluminum containing material comprising tumbling mixture of finely ground aluminum-containing material and limestone and alkaline reacting solution of alkali metal compound to form pellets, sintering pellets to convert aluminum into soluble salt, etc. No. 2,420,852. Frederick Ratcliffe Archibald to Nepheline Products, Ltd.

Applying to surface of member composed of metal other than tungsten or molybdenum tenaciously adherent coating of solid lubricant of metallic compound selected from sulfides, selenides and tellurides of tungsten and molybdenum. No. 2,420,886. Carthrae M. Laffoon, Jr., to Westinghouse Electric Corporation.

Removing tarnish from silverware while immersed in electrolytic bath. No. 2,421,027. Herbert M. Isaacson.

Metal coating surface of non-conductive material comprises roughening surface, cleaning surface immersing in following solution for ½-1 minute, stannous fluoborate 15-20 grams, fluoboric acid (42%) 250 c.c., sodium chioride 75-100 grams, water 1000 cc, to cause surface to be receptive to formation of subsequent conductive layer washing to remove excess of solution treating washed material in any of silvering solutions. No. 2,421,079. Harold Narcus.

Electrolytic machine for refining impure metal electrodes by electrolysis. No. 2,421,209. Karl A. Lindner and William M. Morrison and Adolph Busche to American Smelting and Refining Company.

Aqueous bath for electrodeposition of zinc, comprising zinc chloride and zinc acetate as entire electrolyte. No. 2,421,265. George B. Hogaboom to Hanson-Van Winkle-Munning Company.

As bath for electrolytic etching of samples of nickel base alloys in preparation for metallographic examination water solution consisting of 62 parts by volume of 38% hydrochloric acid, 35 parts 10% solution of ferric chloride in water, 2 parts glacial acetic acid, combined with one part water solution proportioned to contain 3 grams of alkali dichromate 3 c.c. of oil of vitriol, 0.10 gram sodium chloride in each 100 c.c. of water. No. 2,421,316. Kenneth J. Carson and Justin M. Kelly to Western Electric Company, Inc.

Canadian

Solution for the treatment of coal comprising a mixture of permanganate of potash, chloride of potash, common salt, gum arabic and burnt umber dissolved and suspended in water. No. 442,708. Bertred G. Robertson.

Pyrometallurgical process for treating tin bearing materials containing sulphur and iron as impurities. No. 442,713. American Smelting and Refining Company (Yuril E. Lebedeff).

Metallurgical process for treating tin hardhead to recover tin metal. No. 442,714. American Smelting and Refining Company (Carroll B. Porter).

Diethylene glycol bis (chloroformate), triethylene glycol bis (chloroformate), and tetraethylene glycol bis (chloroformate). No. 443,090. Pittsburgh Plate Glass Company (Irving Elkin Muskat and Franklin Strain).

Producing alpha-naphtho-quinones by direct oxidation of a condensed ring aromatic hydrocarbon selected from the group consisting of naphthalene and beta-substituted naphthalenes. No. 443,118. Velsicol Corp. (Julius Hyman and Carl Frederick Peters).

*Organic

Preparing tetrahydrodibenzopyran which includes condensing R_1-cyclohexanone-2-carboxylate with 1,3-dihydroxy 5-R_2CH_3-benzene and treating pyrone reaction product with R-Grignard reagent to form corresponding tetrahydro-6-dibenzopyran, etc. No. 2,419,935. Roger Adams.

Tetrahydro cannabinols represented by formula described in patent. No. 2,419,936. Roger Adams.

Pyran compound represented by formula described in patent. No. 2,419,937. Roger Adams.

Preparing sulfur-containing materials comprises reacting ethylenically polyunsaturated macromolecular polymer having iodine number of at least 25 with monocarbothiolic acid in presence of peroxy catalyst until at least one mole of monocarbothiolic acid is introduced per four ethylenic linkages in polymer. No. 2,419,943. William James Burke to E. I. du Pont de Nemours & Company.

Producing ethanol comprises fermenting natural sugar mash with mixed culture of molasses yeast and grain yeast. No. 2,419,960. David A. Legg to Publicker Industries, Inc.

Separating anthracene from crude carbazole containing anthracene by mixing and agitating crude carbazole, in absence of solvent-diluent, with solid potassium hydroxide while heating at temperature at which crude carbazole is liquefied and not above 235°C. to form potassium carbazolate, etc. No. 2,419,969. Hugh Rodman, Jr., to Koppers Company, Inc.

Preparing para-dinitrosobenzenes comprises oxidizing para-quinonedioxime in alkaline solution with one mol of alkali metal hypohalite per mol of para-quinone dioxime at from −5° to 50°C. No. 2,419,976. Joseph H. Trepagnier and John V. Vaughen to E. I. du Pont de Nemours & Company.

In producing anthrimide by heating anthraquinone compound having exchangeable halogen atom with anthraquinone compound having NH_2 group in presence of solid cupriferous catalyst and of acid absorbing agent selected from alkali-metal carbonates and acetates, improvement consists of heating materials at 150° to 350°C. while mixture is subjected to constant attrition and mixing. No. 2,420,022. John Marlin Tinker and Otto Stallmann to E. I. du Pont de Nemours & Company.

Producing product containing as essential active ingredient mycrene, comprising vaporizing nopinene, passing vapor over period of 5 seconds through reaction zone at 370° to 425°C. cooling reaction vapor to liquid condensate. No. 2,420,131. Leo A. Goldblatt and Samuel Palkin.

Reacting in solution in inert solvent and for 18.5 hours, polymeric organic compound having plurality of ethylenic linkages and iodine number of at least 25 with at least 10% by weight of polymer, of carbothiolic acid which is hydrocarbon except for carbothiolic group. No. 2,420,194. Lawrence Marion Richards to E. I. du Pont de Nemours & Company.

3,4-dimethyl-N-tetraacylribonyl-aniline. No. 2,420,210. Max Tishler to Merck & Co., Inc.

Recovering lactic acid from acidified aqueous fermentation liquors comprises reacting alcohol therewith by passing stream of alcohol vapor in countercurrent flow and in contact with acidified fermentation liquor at 50°C. to 135°C. removing vapor mixture comprising alcohol, water, and lactate of alcohol converting lactate of alcohol to lactic acid. No. 2,420,234. Edward M. Filachione and Charles H. Fisher to United States of America.

Preparing gamma-valero-lactone comprising heating 1,4-pentanediol in presence of catalyst comprising copper chromite until evolution of hydrogen has ceased, recovering gamma-valero-lactone from reaction mixture. No. 2,420,250. Lucas P. Kyrides and Ferdinand B. Zienty to Monsanto Chemical Company.

Manufacture of addition compounds of lactic acid salts with acetic acid. No. 2,420,255. Ritchie Hart Lock to Howards & Sons, Limited.

Aqueous emulsion of distillation residue derived from hydrogenated natural fatty oil by distilling off tractions up through octadecyl alcohol in which emulsifying agent is surface-active water-soluble non-acidic salt of long-chain alkyl acid-ester of phosphoric acid. No. 2,420,328. Joseph Harrel Shipp and Charles J. Pedersen to E. I. du Pont de Nemours & Company.

Aqueous emulsion of distillation residue derived from hydrogenated natural fatty oil by distilling off fractions up through octadecyl alcohol, in which emulsifying agent is surface-active water-soluble non-acidic salt of long-chain alkyl acid-ester of phosphoric acid, emulsion having "Tetralin" therein inhibit foaming. No. 2,420,329. Joseph Harrel Shipp and Osborne Coster Bacon and Charles J. Pedersen to E. I. du Pont de Nemours & Company.

Zein composition comprising plasticized zein containing half ester of dicarboxylic acid having 4 to 18 carbon atoms and monohydric alcohol having 1 to 12 carbon atoms as principal plasticizing agent. No. 2,420,381. Latimer D. Myers to Emery Industries, Inc.

Catalytic reduction of nitrocompounds comprises reacting hydrogen with organic nitrocompound having halogen atom and nitro group attached to same carbon atom remainder of compound consisting solely of carbon and hydrogen, effecting reaction in absence of aqueous medium in presence of platinum group metal hydrogenation catalyst. No. 2,420,382. James A. Robertson to E. I. du Pont de Nemours & Company.

Reacting straight-chain mono-olefine having from 12 to 24 carbon atoms in liquid state with gaseous sulphur dioxide and gaseous chlorine in ratio of ¼ to 20 moles of sulphur dioxide to 1 mole of chlorine maintaining temperature within range of 0° to 100°C. continuing reaction until sulphonyl chloride derivative of mono-olefine has been formed. No. 2,420,383. John Ross to Colgate-Palmolive-Peet Company.

2-amino-5-alkenyl-1,3,4-thiadiazoles of formula described in patent. No. 2,420,434. Lucas P. Kyrides and Ferdinand B. Zienty and Robert W. Stephenson to Monsanto Chemical Company.

Preparing butadiene comprises reacting acetaldehyde diethyl acetal, vinyl ethyl ether and ethylene at 185°C. to 195°C. in presence of catalyst comprising core of metal selected from beryllium, magnesium, zinc, cadmium, aluminum, and alloys thereof, core coated with partially reduced oxide of metal from family A of groups V and VI of the periodic system. No. 2,420,477. William J. Hale and Harry Miller to National Agrol Company, Inc.

Preparing hydroxy-pregnane derivatives. No. 2,420,490. Russell Earl Marker to Parke, Davis & Company.

Recovery of polymethylolalkane from reaction liquor obtained from condensation of formaldehyde and aliphatic aldehyde having greater number of carbon atoms in molecule than acetaldehyde in presence of alkaline condensing agent. No. 2,420,496. Herman A. Poitras, John E. Snow and Sylvio A. De Lorenzo to Heyden Chemical Corporation.

Separation of tripentaerythritol from water-insoluble impurities comprises suspending tripentaerythritol containing water-insoluble impurities in aqueous solution of acid selected from formic, hydrochloric and sulfuric acids at temperature approximating its boiling point, etc. No. 2,420,497. Herman A. Poitras and John E. Snow to Heyden Chemical Corporation.

As new product, anhydro-hexitol completely etherified with radicals selected from alkyl aryl and aralykyl radicals. No. 2,420,519. Kenneth R. Brown to Atlas Powder Company.

Resolving mixture containing 3-picoline, 4-picoline and 2,6-lutidine. No. 2,420,529. Karl Henry Engel to Allied Chemical & Dye Corporation.

Dehydrogenating hydrocarbons comprises effecting dehydrogenation in presence of catalyst composition obtained by adding to aqueous aluminum salt solution, free of chromium substance selected from ammonia and carbonates of ammonia, etc. No. 2,420,563. Peter William Reynolds, Arthur William Charles Taylor and John George Mackay Bremner to Imperial Chemical Industries, Ltd.

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* *U. S. Patents from Vol. 598, Nos. 1, 2, 3, 4. Canadian from July 1 - July 22, 1947.*

Preparing n-butyraldimine comprising reacting one molecular proportion of n-butyraldehyde with at least one molecular proportion of ammonia in presence of from 2 to 4 molecular proportions of water for each mole of ammonia. No. 2,420,584. Marshall R. Brimer, James E. Magoffin and Harold Von Bramer to Eastman Kodak Company.

Producing mononuclear aromatic compounds comprises heating one of a class consisting of asymmetric diaryl substituted paraffins and their nuclear substituted derivatives having at least 2 carbon atoms in paraffin chain at 350°C. passing heated substance through finely divided catalyst. No. 2,420,688. Murray Gray Sturrock and Thomas Lawe to Dominion Tar & Chemical Company, Ltd.

Producing mono nuclear aromatic compounds including dimethyl styrene step comprises heating asymmetric dixylyl ethane in presence of finely divided catalyst which promotes simple molecular decomposition 350°C. No. 2,420,689. Murray Gray Sturrock and Thomas Lawe to Dominion Tar & Chemical Company, Ltd.

Preparing mixed ester comprises reacting as essential ingredients polyhydric alcohol with monocarboxylic acid containing conjugated carbon-to-carbon double bonds. No. 2,420,694. Rudolf Barthel to Bakelite Corporation.

In production of amino-hydrazine of formula NH_2RNHNH_2 step comprises reacting substituted ester of formula AN-R-X, AN being diacyl imido group X a negative radicle of strong acid and R an aliphatic radicle with hydrazine. No. 2,420,702. James Gordon Napier Drewitt and Donald Peter Young to British Celanese, Ltd.

Production of hexachloroethane comprises charging tetrachlorethylene into vented pressure-type reactor to somewhat less than full capacity thereof; displacing air from above liquid by means of gas inert to reaction, etc. No. 2,420,801. George B. Stratton to Hooker Electrochemical Company.

Production of carbon black having volatile content in excess of 12% moderate surface area and long flow characteristics. No. 2,420,810. Richard I. Bray, Jacob Gabry and Charles B. Wendell, Jr., to Godfrey L. Cabot, Inc.

Production of monomeric cyclic sulfones while inhibiting undesirable side reactions of type of polymerization and formation of polysulfones. No. 2,420,834. Rupert C. Morris and Harry de V. Finch to Shell Development Company.

Stabilizing vinyl aromatic compounds comprises dissolving therein member of group consisting of aliphatic conjugated diolefins and acetylenes having boiling points below 10-30°C. in amount to limit of solubility of stabilizer in vinyl compound. No. 2,420,862. Thomas S. Chambers to Standard Oil Development Company.

Separating butadiene from compositions containing butadiene and acetylenes comprises introducing into intermediate part of desorber solution of copper salt capable of forming addition compounds with butadiene and acetylenes, etc. No. 2,420,915. James K. Small and Richard A. Given to Standard Oil Development Company.

Producing succinic acid from butyrolactone comprises acidifying aqueous solution of butyrolactone with sulphuric acid heating solution to 40°C. to 70°C. electrolyzing solution in contact with anode of large surface area chilling solution to recover crystals of succinic acid. No. 2,420,954. Robert M. Isham to Danciger Oil & Refineries, Inc.

Producing solid pentachloropropane-containing product in which solid pentachloropropane isomer having melting point of 180°C. predominates and from which said isomer may be separated comprises introducing chlorine into 1,1,1,2,tetrachloropropane at 65°C. to 180°C. until one hydrogen atom of tetrachloropropane is replaced by chlorine atom to produce said pentachloropropane isomer. No. 2,420,975. Ralph E. Plump to Pennsylvania Salt Manufacturing Co.

Producing butyl and isopropyl alcohols comprises forming aqueous mash containing carbohydrate of group consisting of cereals and sugars and containing assimilable nitrogen, inoculating mash with bacterial culture containing Clostridium amylosaccaro butyl-propylicum incubating inoculated mash at temperature and for time to permit fermentation. No. 2,420,998. Samuel C. Beesch and David A. Legg to Publicker Industries, Inc.

Apparatus for producing finely divided carbon comprising retort having cylindrical heat-insulating heat-radiant side wall closely surrounding and defining elongated reaction zone to be maintained at hydrocarbon cracking temperature, etc. No. 2,420,999. Joseph W. Ayers to Phillips Petroleum Company.

New product 1-halo-4,8,12-trimethyl-tridecane where halogen is selected from bromine and chlorine. No. 2,421,090. Lee Irvin Smith and Joseph A. Sprung to Regents of the University of Minnesota.

Producing nordihydroguaiaretic acid comprises extracting acidualted alkali extract of plant material of species Larrea divaricata containing nordihydroguaiaretic acid with first solvent selected from water miscible mono and polyhydric low aliphatic alcohols adding to solution second solvent miscible with first solvent, second solvent being selected from monocyclic aromatic hydrocarbons and halogenated low aliphatic hydrocarbons washing mixture with water to remove first solvent, crystallizing nordihydroguaiaretic acid from second solvent. No. 2,421,109. Joseph Adams to Regents of the University of Minnesota.

Beta-isobutyl amino-beta, beta-dimethyl ethyl benzoate of formulae described in patent. No. 2,421,129. Julian R. Reasenberg and Samuel D. Goldberg to Oradent Chemical Co., Inc.

Separating 1,1',5',1''-trianthrimide-2,2',6',2''-dicarbazole from monochlorinated-1,1'-dianthrimide-2,2'-carbazole. No. 2,421,163. Mario Scalera to American Cyanamid Company.

Ureide of diethyl glutarate having structural formula described in patent. No. 2,421,233. Reginald Auchincloss and Fred Linsker.

N'-disubstituted thiocarbamyl sulfenamide of formula described in patent. No. 2,421,352. Philip T. Paul and Byron A. Hunter to United States Rubber Company.

Making dienes, comprises passing acyclic mono-olefinic aldehyde having at least four carbon atoms and monohydric alcohol having at least one hydrogen atom attached to carbinol carbon atom over catalyst of group consisting of oxides and silicates of zirconium, tantalum and columbium. No. 2,421,361. Walter J. Toussaint and Jesse T. Dunn to Carbide and Carbon Chemicals Corporation.

Canadian

Substituted 1,3,5-triazinyl-6-amino-phenyl-arsenic compound. No. 442,542. Ernst A. H. Friedheim.

*Packaging

Seal setting device for wrapping machine in which heat is applied to seals of wrapped article to join overlapped portion thereof. No. 2,420,763. James D. Wells to American Machine & Foundry Company.

Fluid removal device for drying drums. No. 2,420,824. Lloyd Hornbostel and John E. Goodwillie to Beloit Iron Works.

Reusable nesting shipping container. No. 2,421,225. William L. Stensgaard to W. L. Stensgaard and Associates, Inc.

Container closure for containers of liquids for intravenous administration. No. 2,421,313. Wayne D. Brandon to Baxter Laboratories, Inc.

*Petroleum

In catalytic dehydrogenation of aliphatic hydrocarbon material in cyclic operation involving use of dehydrogenation catalyst alternately to promote dehydrogenation while supplying endothermic reaction heat and declining within predetermined range of temperatures, the process of maintaining catalyst within desired range of temperatures without use of extraneous heat exchange fluid. No. 2,419,997. Eugene J. Houdry to Houdry Process Corporation.

Preparing volatile liquid hydrocarbon product useful as blending agent in leaded fuels for supercharged aviation engines comprises subjecting to vapor phase cracking petroleum hydrocarbon stock composed of hydrocarbons having at least 5 carbon atoms under conditions to produce large quantities of cyclopentadiene with other unsaturated C_5 to C_6 hydrocarbons boiling below 110°F. and above 127°F., etc. No. 2,420,030. Richard C. Brandon to Standard Oil Development Company.

Starting-up procedure for oil conversion process which is executed at elevated temperatures and wherein reaction is carried out in presence of powdered catalyst in reactor and fouled catalyst is revivified in regenerator. No. 2,420,049. Homer Z. Martin to Standard Oil Development Company.

Improved lubricating oil composition consisting of mineral lubricating oil containing from 0.5 to 5% of oil-soluble hydrophilic polyvalent metal containing derivative of organic compound metal compound possessing engine detergent properties, from 0.01 to 0.3% of aliphatic primary amine containing from 8 to 22 carbon atoms per molecule. No. 2,420,068. Gordon W. Duncan and John C. Zimmer to Standard Oil Development Company.

Converting polyalkylbenzene to alkyl derivative of benzene having fewer alkyl groups per molecule, comprises treating polyalkylbenzene in admixture with molecular excess of aromatic hydrocarbon of class consisting of benzene and alkylbenzenes having at least two alkyl groups fewer than polyalkylbenzene in presence of hydrofluoric acid which has been previously utilized as catalyst in alkylation of benzene with olefins. No. 2,420,073. Frederick E. Frey to Phillips Petroleum Company.

Petroleum bituminous composition comprising asphalt and oil-soluble polymerized aliphatic monohydric alcohol ester of methacrylic acid in which alcohol contains from 8 to 10 carbon atoms, polymer being present in amount of from 2 to 5% based on combined weight of asphalt and polymer. No. 2,420,082. Earl W. Klinger to Standard Oil Development Company.

Production of high octane paraffinic hydrocarbon fraction from mixture of saturated hyrocarbons comprising normal heptane and dimethylcyclopentane. No. 2,420,086. Sumner H. McAllister and Chesetr C. Crawford to Shell Development Company.

Subjecting phenol-extracted petroleum distillate of turbine oil, hydraulic oil and transformer oil viscosity range and having ratio of paraffinic to naphthenic constituents of at least 3 to 1, to treatment with activated clay in presence of hydrated lime at 350-500°F. to produce stabilized refined oil of improved resistance to oxidation and emulsification. No. 2,420,108. Reginald K. Stratford and Oldrich S. Pokorny to Standard Oil Development Company.

Treating emulsified oil well streams to defoam streams and to break down emulsion which include discharging well stream directly into body of heated water to release gas therefrom, controlling temperature in order to release sufficient gas to eliminate foam washing defoamed oil, in a body of water heated to temperature to break emulsion. No. 2,420,115. Jay P. Walker and Clarence O. Glasgow.

Inhibiting deterioration of hydrocarbon distillate boiling in gasoline range in presence of metal normally active to catalyze said deterioration comprises adding to distillate in small amount to suppress catalytic effect of metal compound having following formula described in patent. No. 2,420,122. Joseph A. Chenicek to Universal Oil Products Company.

Manufacture of polycyclic hydrocarbon comprises subjecting secondary butyl benzene to action of dehydrocyclization catalyst, comprising compound of element selected from left-hand columns of groups V and VI of periodic table, under dehydrocyclization conditions. No. 2,420,143. William J. Mattox to Universal Oil Products Company.

Conversion of hydrocarbons at high cracking temperature and low pressure to produce more valuable normally gaseous hydrocarbons including butadiene. No. 2,420,145. Jerry McAfee to Universal Oil Products Company.

Continuous process for preparing blended asphaltic oil from crude oil stock containing asphaltic and non-asphaltic materials comprising contacting oils countercurrently with continuous stream of natural gas at pressure between 9,000 and 10,000 pounds per square inch and at 120°F., etc. No. 2,420,185. Harold E. Messmore to Phillips Petroleum Company.

Removing sulfur compounds from hydrocarbon oils comprising contacting oil with aqueous solution, of compound selected from alkali metal hydroxides and carbonates in presence of comminuted alloy comprising metal selected from copper and nickel and element selected from silicon, beryllium, aluminum and zinc. No. 2,420,218. George W. Ayers to The Pure Oil Company.

Manufacture of viscosity increasing agent for hydrocarbon oils, comprises precipitating hydrated aluminum oxide in aqueous medium by interaction in solution therein of water-soluble salt of aluminum and water-soluble alkali, in presence in dispersion in medium of soap-forming fatty acid and hydrophylic colloid. No. 2,420,233. Lawrence John Edwards to A. Boake Roberts & Company, Limited.

Separating naphthenic acid soaps from aqueous sodium hydroxide solution containing at least 10% by weight of free sodium hydroxide and free from solventizers comprising cooling solution to 50°F. at which naphthenic acid soaps separate from solution as supernatant solid. No. 2,420,244. Lawrence M. Henderson and George W. Ayers, Jr., to The Pure Oil Company.

Preparing lubricant comprising cooking sulfurized and phosphorized fatty material, etc. No. 2,420,280. John S. Yule and Harry L. Moir to The Pure Oil Company.

Alkylation of isoparaffin with olefin comprises reacting olefin with acid to form corresponding alkyl ester alkylating isoparaffin with alkyl ester in presence of corresponding acid alkylation catalyst. No. 2,420,369. Arthur R. Goldsby to The Texas Company.

In catalytic conversion of hydrocarbons in liquid phase at elevated temperatures below 250°F. in presence of liquid aluminum halide-hydrocarbon complex catalyst and hydrogen halide promoter in reaction zone bounded by metal wall submerged in catalyst liquid and normally subject to corrosion thereby method comprises pretreating aluminum halide-hydrocarbon complex liquid by heating same in absence of hydrocarbons in separate treating zone at 150°F. to 250°F. for 30 to 60 hours, etc. No. 2,420,386. William Rusler Smith and William F. Glassmire to The Texas Company.

Mineral oil composition comprising major amount of a petroleum lubricating oil and a minor amount of benzaldehyde phenylhydrazone to retard halogenation of petroleum lubricating oil. No. 2,420,446. Albert

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* *U. S. Patents from Vol. 598, Nos. 1, 2, 3, 4. Canadian from July 1 - July 22, 1947.*

G. Rocchini and Charles Byrin Pattinson, Jr., to Gulf Research & Development Company.

Catalytic cracking of hydrocarbon oils. No. 2,420,534. Edwin J. Gohr, Donald L. Campbell, John M. Graham and William I. Thompson to Standard Oil Development Company.

Improved process for removal of mercaptans from petroleum naphthas comprising mixing naphtha with solution of caustic, etc. No. 2,420,544. Minor C. K. Jones to Standard Oil Development Company.

In catalytic conversions of charging stock at conversion temperature with finely-divided solid catalyst improvement comprises maintaining solid catalyst in finely-divided condition, fluidized throughout, first in gaseous charging stock and then in regeneration gas series contact therewith, etc. No. 2,420,558. John C. Munday to Standard Oil Development Company.

Producing aromatic hydrocarbon comprises reacting monocyclic diolefinic hydrocarbon containing ring of 6 carbon atoms in presence of dilute aqueous solution containing from 0.1 to 5% by weight of acid-acting catalyst at 100° to 400°C. No. 2,420,749. Vladimir N. Ipatieff and Herman Pines to Universal Oil Products Company.

In polymerizing conjugated butadiene hydrocarbon in bulk to produce synthetic polymerized substances step comprises carrying on polymerization in presence of 0.5 to 2.0 parts of hexaryl ethane per 100 parts of butadiene hydrocarbon at 100-120°C. for 24-100 hours. No. 2,420,750. David Josefowitz to Publicker Industries, Inc.

Production of commercial grades of toluene suitable for nitration from naphthenic petroleum distillates. No. 2,420,883. Ava J. Johnson, Mott Souders, Jr., and John E. Marsland to Shell Development Company.

Mineral lubricating oil containing stabilizing quantity of metal salt of thiophosphoric acid ester of o yl phenol sulfide. No. 2,420,893. John G. McNab and Charles L. F ming, Jr., to Standard Oil Development Company.

Producing gasoline by cracking higher boiling hydrocarbons wherein stream of fresh oil to be cracked is passed through initial cracking zone containing active cracking catalyst maintained at active cracking temperature at rate which will substantially crack oil into gasoline constituents, said catalyst being continuously circulated first through cracking zone and thereafter through regenerating zone. No. 2,420,900. James E. Moise to Standard Oil Development Company.

Lubricant comprising 5-30% of water-insoluble metal soap wherein metal of soap is selected from lithium, calcium, barium, and strontium, 70-95% of isomeric mixture of chlorinaetd diphenyl from 0.1 to 1% of aluminum stearate, from 0.1 to 1% of zinc naphthenate lubricant having density greater than sea water. No. 2,420,902. Arnold J. Morway and John C. Zimmer to Standard Oil Development Company.

Catalytic conversion of high boiling petroleum fractions into hydrocarbons of gasoline boiling range. No. 2,420,904. Henry D. Noll to Socony-Vacuum Oil Company, Inc.

In liquid phase solvent extraction of olefin from mixture of olefins and saturated hydrocarbons steps in which hydrocarbon mixture is intimately contacted with preferential solvent for olefin in plurality of stages, etc. No. 2,420,906. John W. Packie and Richard A. Given to Standard Oil Development Company.

Hydrocarbon oil composition resistant to copper plating comprising hydrocarbon oil normally susceptible to cause copper plating in the presence of copper-containing metal copper deactivator and tricresyl phosphate. No. 2,420,953. Russell A. Hunt, Jr., to Standard Oil Company.

Improved mineral oil composition comprising viscous mineral oil fraction having in admixture therewith: minor proportion, from 0.5% to 10% of oil-soluble salt characterized by detergent action in oil; and minor proportion from 0.05% to 5.0% of oil-soluble phosphorus and sulfur-containing reaction product obtained by reaction of phosphorus pentasulfide and hydrocarbon stock. No. 2,421,004. Henry G. Berger and Everett W. Fuller to Socony-Vacuum Oil Company, Inc.

Obtaining polar-type corrosion-inhibiting agents soluble in petroleum lubricating oils and insoluble in water from mixtures of unsaponifiable oxygenated predominately aliphatic and saturated hydrocarbons derived from petroleum fraction by the liquid phase partial oxidation latter using oxygen-containing gas as oxidizing means. No. 2,421,040. James E. Shields and Edward V. Reilly to Alox Corporation.

Composition of matter comprising mineral oil lubricant and viscosity increasing agent soluble in mineral oil and comprising polymerization product obtainable by interpolymerizing compound which is polymerizable by reason of having double carbon linkage, etc. No. 2,421,082. Mathias Pier and Friedrich Christmann.

Separation of isobutene from mixture of C_4 hydrocarbons containing isobutene and butene-1. No. 2,421,229. Gordon B. Zimmerman to Universal Oil Products Company.

Desulphurizing hydrocarbons boiling within motor fuel range in which motor fuel hydroarbons are heated to vaporizing temperatures hydroarbon vapors passed through bed of solid adsorbent catalytic material consisting of clay whereby sulphur compounds present in hydrocarbon oil are converted into more easily removable sulphur compounds. No. 2,421,320. Joseph C. Ernest to Mid-West Refineries, Inc.

Reforticiation of aluminum halide-hydrocarbon complex catalysts. No. 2,421,326. John L. Groebe, William B. Reeves and Daniel C. Campbell to Phillips Petroleum Company.

Production of monoalkylbenzenes comprises supplying olefin-containing stream and alkylated mononuclear aromatics to alkylation zone, further alkylating aromatics with olefins in presence of alkylation catalyst within zone, etc. No. 2,421,331. Everett A. Johnson to Standard Oil Company.

Canadian

Improved lubricant comprising a mineral oil and, as an extreme pressure agent, a hydrogenated sulphurized abietic acid substance. No. 442,654. Standard Oil Development Company (Arnold J. Morway and John C. Zimmer).

Lubricant comprising naphthenic base mineral lubricating oil having 1 per cent of a mixture of oil-soluble calcium soaps of resin acids and oil-soluble calcium soaps of pine fatty acids. No. 442,662. Union Oil Company of California (Marcellus T. Flaxman).

Controlling corrosion in gasoline pipe lines by introducing into the line a small amount, not exceeding 5 pounds per thousand barrels of oil, of an alkali amide. No. 442,961. Standard Oil Company (Albert A. Anderson).

A composition of matter comprising in combination a low-temperature olefin-diolefin interpolymer with polyethylene in sulphur and small, significant quantities of zinc oxide, stearic acid and an organic sulphide. No. 442,963. Standard Oil Development Company (Nathan S. Beekley, Jr.).

Lubricant for internal combustion engines which comprises a mineral base, a product obtained by reacting para-cresol with isobutene in the presence of sulphuric acid as a catalyst at a temperature of about 70°C. and a small quantity of zinc lauryl mercaptide. No. 442,964. Standard Oil Development Company (John G. McNab, Carroll J. Wilson and Carl Winning).

*Photographic

Gelatino-silver-halide emulsion capable of exhibiting improved speed and contrast characteristics when exposed and developed in developing solution having pH of at least 9.5 comprising gelatino-silver halide emulsion layer having uniformly dispersed therein mixture of water-insoluble hydrazine derivative having formula described in patent. No. 2,419,974. Robert E. Stauffer and William F. Smith to Eastman Kodak Company.

Improving sensitivity characteristics of silver halide photographic layer with respect to radiation consisting of light of wave length shorter than red. No. 2,419,975. Adrian P. H. Trivelli and William F. Smith to Eastman Kodak Company.

Preparing polyamide photographic emulsions. No. 2,420,455. William W. Watkins to E. I. du Pont de Nemours & Company.

Antistatic photographic film. No. 2,420,610. Fritz W. H. Mueller to General Aniline & Film Corporation.

Antistatic photographic film. No. 2,420,611. Fritz W. H. Mueller to General Aniline Film Corporation.

Gelatino silver halide emulsion layer for bleachout process of color photography uniformly colored with disazo dye compound having formula described in patent. No. 2,420,631. George J. Taylor to Eastman Kodak Company.

*Polymers

Heating polymeric trifluoromonochloroethylene, having melting point above 300°C. at temperature between 400°C. and 700°C. in absence of reactive substances to convert major proportion of polymer to monomeric trifluoromonochloroethylene, then cooling products, separating monomeric trifluoromonochloroethylene. No. 2,420,222. Anthony F. Benning and Joseph D. Park to Kinetic Chemicals, Inc.

Process for cutting polymerized vinyl aromatic amterial. No. 2,420,284. Thomas S. Carswell to Monsanto Chemical Company.

Producing polymers from normally gaseous olefinic charging stock comprises passing olefinic gas stream through bed of relatively active polymerizing catalyst simultaneously passing second stream of olefinic gas through bed of less active polymerizing catalyst, etc. No. 2,420,327. William B. Shanley to Universal Oil Products Company.

Completely acetone-soluble copolymer of vinyl chloride and acrylonitrile, 0.1 gram of which copolymer in 50 cc. of acetonyl acetone has specific viscosity at 20°C. of 0.1 to 0.6, formed by conjoint polymerization of vinyl chloride and acrylonitrile while maintaining monomers within range from 5.06 to 49.0 parts of monomeric vinyl chloride to one part of monomeric acrylonitrile by weight. No. 2,420,330. Leland C. Shriver and George H. Fremon to Carbide and Carbon Chemicals Corporation.

Treatment of polymers with acylamides and aldehydes. No. 2,420,730. David W. Woodward to E. I. du Pont de Nemours & Company.

Making composite piezoelectric plastic material comprising, placing quantity of finely divided piezoelectric crystals within fluid body of plastic material distributing crystals uniformly throughout plastic, solidifying plastic, melting crystals, recrystallizing and orienting crystals in situ so that effective proportion will have electrical axes oriented in uniform directions. No. 2,420,864. Constantin Chilowsky.

Resinous copolymer which is product of polymerization of mixture of liquid methyl vinyl polysiloxane in amount corresponding to from 30 to 60 per cent by weight of mixture and methyl methacrylate. No. 2,420,-911. George F. Roedel to General Electric Company.

Preparing alkenylchlorosilane comprises effecting reaction between heated silicon and alkenyl chloride selected from vinyl chloride and allyl chloride. No. 2,420,912. Dallas T. Hurd to General Electric Company.

Producing linear polymer containing cyclic imide groups in its molecular chains. No. 2,421,024. Carl J. Frosch to Bell Telephone Laboratories, Inc.

Composition of matter comprising ethyl cellulose plasticized with plasticizer selected from liquid dimer of alpha-methyl para-methyl styrene, solid dimer of alpha-methyl para-methyl styrene, liquid trimer of alpha-methyl para-methyl styrene, hydrogenated liquid dimer of alpha-methyl para-methyl styrene with only normally unsaturated side chain of dimer being completely saturated with hydrogen. No. 2,421,046. Arthur J. Warner and Willard de Camp Crater, Jr., to Federal Telephone and Radio Corporation.

Canadian

Improved filaments composed of synthetic linear polyamide containing 10 to 20 per cent of a phenolformaldehyde resin. No. 442,585. Canadian Industries, Ltd. (William Robert McClellan).

Curing a polymerized vinyl chloride-vinylidene chloride plastic by heating in the presence of a quaternary ammonium base. No. 442,666. Wingfoot Corporation (Thomas Henry Rogers, Jr., and Robert Donald Vickers).

Process comprising polymerizing soluble polycyclopentadiene with monomeric ring-substituted methyl styrene. No. 442,975. The United Gas Improvement Company (Frank John Soday).

Process cimprising polymerizing soluble polycyclopentadiene with monomeric styrene. No. 442,976. The United Gas Improvement Company (Frank John Soday).

Stable aqueous emulsion made by emulsion polymerization and obtained by polymerizing in aqueous medium a liquid water-insoluble polymerizable monomeric vinyl compound in the presence of an anion-active surface tension depressant. No. 443,097. Shawinigan Chemicals, Ltd. (Henry Michael Collins).

Process of producing an aqueous emulsion of a polyvinyl ester, said ester having a specified viscosity within the range from about 1 to about 150 centipoises. No. 443,098. Shawinigan Chemicals, Ltd. (Mogens Kiar).

Process for the manufacture of a coarsegrained suspension of a polyvinyl ester. No. 443,099. Shawinigan Chemicals, Ltd. (Henry Michael Collins).

*Processes and Methods

In clarifying aqueous liquids containing suspended solids, step comprises adding small amount of saponite to clarify liquids. No. 2,420,340. John W. Ryznar to National Aluminate Corporation.

Hair drying means provided with silica gel. No. 2,420,358. Emmett J. Culligan and George H. Klumb to Culligan Zeolite Company.

Dry distillation, comprising preheating material to be treated in first separate step, dry-distilling preheated material in second separate step, heating heat-carrying and heat-delivering loose bodies by means of heat obtained from products formed during dry-distillation, etc. No. 2,420,-376. Edvin Andreas Johansson.

Forming smoke consisting in separately vaporizing ethylenediamine and acetic acid and bringing vaporized ethylenediamine and acetic acid into contact in atmosphere. No. 2,420,416. Herbert E. Britt.

Removing cations from fluid media comprises treating fluid containing cations with granular water-insoluble composition of matter having particle size less than 8 mesh comprising hydrolyzed product of reaction of mixture including furfural and mineral acid halide selected sulfuryl chloride and phosphorus oxychloride separating fluid from water-insoluble

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* *U. S. Patents from Vol. 598, Nos. 1, 2, 3, 4. Canadian from July 1 - July 22, 1947.*

composition of matter. No. 2,420,419. James R. Dudley to American Cyanamid Company.

Eliminating foam from body of liquid employed in process which causes formation of foam in liquid solution and masses of foam upon surface thereof consists in formation of body of carbonated water saturated with carbon dioxide and held therein under pressure, etc. No. 2,420,600. Philipp M. Kallusky to Clarence E. Kallusky.

In ornamenting fusible transparent synthetic organic thermoplastic material, steps of first forming thermoplastic material into generally transparent layer, drawing given design on surface of layer with needle point element heated to fusing temperature of material while at the same time pressing element into surface of layer to melt and locally fuse the thermoplastic material. No. 2,420,614. Emile Norman.

Treating liquid with a suspension of solids by passage thereof through separator, regenerating separated solids for re-use with untreated liquid. No. 2,420,761. Charles L. Thomas to Universal Oil Products Company.

Process comprising dissolving in mutual solvent tacky goldenrod rubber and compounding vulcanizing chemicals, etc. No. 2,420,788. Forrest L. McKennon and John Raymond Lindquist to United States of America.

Converting fluid alkaline latex to a thixotropic gel. No. 2,421,108. Clarence Walter Wilson to California Fruit Gaowers Exchange.

Making relatively pure extract of plants of species Larrea divaricata comprises extracting plant with water immiscible organic solvent which extracts material exhibiting color reactions of catechol with ferric chloride in presence of sodium carbonate to produce primary extract containing nordihydroguaiaretic acid, fat, waxes, rubber-like materials and pigments evaporating part of solvent to precipitate impurities, etc. No. 2,241,117. Ole Gisvold to Regents of the University of Minnesota.

Separating nordihydroguaiaretic acid from crude extract containing nordihydroguariaretic acid and impurities comprises preparing solution of nordihydroguaiaretic acid in lower nitroparaffin crystallizing nardihydroguaiaretic acid from nitroparaffin separating crystals from nitroparaffin. No. 2.421,118. Ole Gisvold to Regents of the University of Minnesota.

*Rubber

Method of curing endless power transmission belt of uncured rubber composition. No. 2,420,278. Charles Walter Yelm to The Gates Rubber Company.

Manufacture of a light hard rubber material having multiplicity of closed non-communicating cells. No. 2,420,815. Lester Cooper and Hans Pfleumer to Rubatex Products, Inc.

Accelerator compound consisting of pulverulent mixture of benzo thiazyl disulfide and zinc stearate in which proportion of zinc stearate approximates 1%-2% by weight on benzo thiazyl disulfide. No. 2,421,243. Ernest B. Curtis to R. T. Vanderbilt Co., Inc.

Canadian

Rubber antioxidant comprising a mixture of 1 part of a secondary aromatic amine antioxidant and from about 0.0001 to about 0.5 part of copper phthalocyanine. No. 442,586 Canadian Industries Ltd. (John Richard Vincent)

*Specialties

Germicide equal in killing power to Staphylococcus aureus of 1:100 phenol solution comprises 1:1400 solution of phenol and soluble, inorganic oxidizing agent in which amount of oxidizing agent is equivalent molecular weight thereof to each gram molecular weight of phenol. No. 2,420,099. Anthony J. Salle and Howard L. Guest to Leo A. Gunther.

Composition of matter consisting of 64% by weight of blown castor oil, 26% isopropanol, 4.5% calcium ricinoleate, 2.7% sodium ricinoleate, 0.8% potassium ricinoleate, 1.7% water. No. 2,420,127. George L. Doelling to Wagner Electric Corporation.

Concrete or mortar mix to yield concrete or motar of enhanced resistance to freezing and thawing comprising hydraulic cement, aggregate and not more than 0.050% of tall oil, by weight on cement. No. 2,420,114. Jacob G. Mark to Dewey and Almy Chemical Company.

Insect repellent composition comprising p-isopropylphenylethyl alcohol incorporated in zinc oxide in such amounts as to form paste-like composition. No. 2,420,271. Bernard V. Travis and Howard A. Jones.

Preparing lubricant additive comprising preparing saponified fatty semi-wax material containing in chemical combination therewith small amount of phosphorus sulfide, separating resulting product into two unequal portions, heating major portion for short time to 300 to 350°F. to remove traces of moisture and objectionable odor reblending it with minor unheated portion. No. 2,420,274. Norman D. Williams and William J. Backoff to The Pure Oil Company.

Solid material to be placed upon and supported by surface of body of water whereby portion of its contents dissolves in water and reacts to produce chemiluminescent light, portion which dissolves consisting of intimate mixture of dry powdered material which when dissolved in water and oxidized gives off chemiluminescent light, powdered water-soluble material which generates nascent oxygen when wetted, and remainder of composition comprising particulate material incorporated in mixture, whereby its buoyancy is increased. No. 2,420,286. Harold T. Lacey and Henry E. Millson, and Frederick H. Heiss to American Cyanamid Company.

Composition of matter comprising toxicant containing 4,4'-dichlorodiphenyl-1,1,1-trichloroethane as essential active ingredient dispersed in aqueous solution of water-soluble hydrolyzed polyvinyl acetate. No. 2,420,295. Gordon F. Biehn and James E. Kirby to E. I. du Pont de Nemours & Company.

Algin composition to form gel when added to water comprising finely ground calcium alginate and finely ground water soluble alginate to produce gel of desired strength. No. 2,420,308. John I. Gates to Kelco Company.

Insect repellent composition comprising solution of 36 parts by weight of dimethyl phthalate and 9 parts by weight of 2-ethyl-1,3-hexanediol incorporated in zinc oxide in amounts as to form paste-like composition. No. 2,420,389. Bernard V. Travis and Howard A. Jones.

Solution of arsenic trioxide in poilyhydric alcohol selected from mannitol and sorbitol solution being toxic to rodents and insects. No. 2,420,568. E. Francis Sennewald.

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* *U. S. Patents from Vol. 598, Nos. 1, 2, 3, 4.*
Canadian from July 1 - July 22, 1947.

It takes more than a uniform to make a football star

It takes more than an ordinary container to make a quality shipping sack for powdered, crushed, and granulated chemicals . . .

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THE RAYMOND BAG COMPANY
Middletown, Ohio

Insecticide composition comprising pyrethrum terpene thiocyanoacetate paratertiary butyl catechol. No. 2,420,809. Joseph N. Borglin to Hercules Powder Company.

Fly spray composition consisting in fly spray base hydrocarbon solvent containing toxic amount of di(para-methoxyphenyl)-trichloromethyl methane. No. 2,420,928. Euclid W. Bousquet and Avery H. Goddin to E. I. du Pont de Nemours & Company.

Volatile chlorinated carbon compound fire extinguishing fluid containing small amount of phosgene suppressing means dissolved therein. No. 2,421,035. David A. McLean to Bell Telephone Laboratories, Inc.

Cutting oil base consisting of 40 to 50 parts by weight of potash resin soap, 30 to 40 parts of glyceryl mono oleate, 5 parts of potassium oleate for emulsifying purposes, 5 to 10 parts water, said composition also including from 5 to 10% oil soluble mineral oil sulphonates. No. 2,421,158. Latimer D. Myers and Victor J. Muckerheide to Emery Industries, Inc.

Cutting oil base consisting of 45 parts by weight rosin soap, 35 parts glyceryl mono-oleate 5 parts red oil soap, 5 to 10 parts of water. No. 2,421,159. Latimer D. Myers and Victor J. Muckerheide, to Emery Industries, Inc.

Stable pyrethrin-containing insecticides stabilized against deterioration by light, improved insecticide compositions comprising pyrethrum extract in hydrocarbon solvent containing minor amount of 2,4,6-tri-alkylated monohydroxy phenol having formula described in patent. No. 2,421,223. Herschel G. Smith and Mark L. Hill to Gulf Oil Corporation.

Printing ink, characterized by superior press stability, whereby ink remains open on ink distributing rolls and inking mechanism of press under conditions of high relative humidity and capable of being set to non-offsetting conditions by application of moisture after printing. No. 2,421,291. Alfred F. Schmutzler to Sun Chemical Corporation.

Canadian

Soluble cutting oil comprising a mineral lubricating oil, an emulsifier and a xanthogen polysulphide having dissolved therein excess elemental sulphur. No. 442,793. Standard Oil Development Company (John C. Zimmer).

Stabilized lubricant containing a barium salt of a dihexyl acid ester of thiophosphoric acid, and lecithin in an amount sufficient to prevent haze. No. 442,857. The Atlantic Refining Company (William Schreiber).

*Textiles

Method of finishing textiles comprises impregnating them with aqueous solution of quaternary ammonium salt of melamine-formaldehyde condensation product, subjecting textiles to heating at above 80°C. to decompose quaternary ammonium salt and set resin on textile fibers. No. 2,420,157. Herbert J. West to American Cyanamid Company.

Novel fabric to replace standard wool fabric formed with two-ply wool fiber warp and filling, having same weight as standard, consisting of yarn of wool fiber having 25% less filling picks and 25% less warp ends with filling single yarn having not more than 75% of twist of yarn of wool fiber having 25% less filling ticks and 25% less warp yarns impregnated with soft plastic to equalize weight of fabric to standard. No. 22,878. William S. Nutter to Goodall Sanford, Inc.

Synthetic textile fibers, fabrics and articles comprising stretched yarn composed of filaments formed of vinyl resin resulting from conjoint polymerization of vinyl halide with acrylonitrile substantially all portions of resin free from acetone-insoluble portions, etc. No. 2,420,565. Edward W. Rugeley, Theophilus A. Feild, Jr. and John L. Petrokubi to Carbide and Carbon Chemicals Corporation.

Electrolytic protective flexible elastic tape comprising generally homogeneous resinous ribbon-like strip having generally glossy surface adherent to itself but capable of satisfactory handling and having tensile strength for tight wrapping of tape without breaking or tearing. No. 2,420,604. Orvis H. Leidy to Michigan Chrome & Chemical Company.

Fabric base material of cellulosic origin flameproofed with solid vitreous enamel silicate which fuses adjacent combustion temperature of base material to viscosity which enables it to be retained on base material. No. 2,420,644. Lyman C. Athy and Paul C. Stufft to Pemco Corporation.

Producing full shades with indigoid vat dyestuff on piece-goods. No. 2,420,729. Edward Weber to Allied Chemical & Dye Corporation.

Stable coloring matter-containing water-in-lacquer emulsion for use in textile decorating. No. 2,421,000. Edward Armatys to Interchemical Corporation.

Treating woolwashery effluents comprises evaporating effluent until content of 4 to 5% of wool grease is obtained heating concentrated effluent to 290 to 302°F. and gauge pressure of 50 p.s.i., settling so treated effluent for period of from one to eight hours to separate grease, suint and muddy liquor. No. 2,421,094. Frank Totney to Industrial Development Corporation of South Africa, Ltd.

Yarn-sizing composition depositing solid coating that permits yarn sized therewith to run through water-wet wick or other humidifying treatment without becoming gummy and without fouling needles and sinkers of knitting machine comprising aqueous solution of water-sensitive hydroxylated polyvinyl resin and 5% to 40% of agent to reduce water-sensitivity of hydroxylated polyvinyl resin agent consisting of barium chloride. No. 2,421,122. Walter R. Haefele to E. I. du Pont de Nemours & Company.

Dyeing synthetic linear polyamide fibres comprise boiling fibre in acid bath containing chrome color, immersing fibre in acid bath containing soluble chromium salt in concentration of ½% by volume steaming fibre at super-atmospheric pressure of eight pounds. No. 2,421,131. Thomas Skeuse, Jr. to Geigy Company, Inc.

New product of manufacture non-inflammable waterproof organic fibre material impregnated with water insoluble melamine salt of pyrophosphoric acid and coated with melamine formaldehyde condensation product. No. 2,421,218. Frederick F. Pollak.

Improving extensibility and strength of hardened artificial filaments, films and like thick materials having protein basis. No. 2,421,302. Robin Hamilton Kendall Thomson to Imperial Chemical Industries Limited.

Treating fabrics by directly depositing onto fabric rubber from aqueous suspension of rubber, etc. No. 2,421,363. Howard A. Young to United States Rubber Company.

Fibrous sheet material for electrolytic formation of azo dyes thereon carrying composition comprising diazotisable sulfonated aromatic amine, quantity of ionizable nitrite to effect diazotization of amine, water-soluble inorganic salt as electrolyte to facilitate passage of electrolyzing current, azo dye coupling component to react with diazonium compound when formed to yield azo dye, alkali to give pH on alkaline side. No. 2,421,367. Myer Solomon to Radio Corporation of America.

Canadian

Method of making elastically contractible adhesive fabric. No. 442,541. Harold A. Evans.

Agricultural

Seed fungicidal preparations comprising inert solid material and lesser quantity of double salt of metal salt and hydroxy phenyl diazonium compound. No. 2,421,369. Wilhelm Bonrath and Ewald Urbschat.

Clear mineral oil horticultural spray containing dissolved minor proportion exceeding its normal solubility in mineral oil of rotenone and minor but rotenone-solubilizing proportion of mixture of polychlorinated alkanes and alkenes of from 3 to 4 carbon atoms. No. 2,421,507. Paul R. Jones to Shell Development Company.

Canadian

Double compound of tetramethylthiuram-disulphide and cupric chloride which has marked fungicidal and seed mordanting activity. No. 443,250. J. R. Geigy A. G. (Paul Muller)

Biochemical

Producing ceramic coating on difficulty wettable refractory material of group consisting of graphite, silicon carbide, fused alumina and mixtures thereof. No. 2,422,215. Charles R. Amberg and Harold C. Harrison to The Exolon Company.

Producing diastatic enzymes comprising cultivating yeasts of species Endomycopsis fibuliger in contact with starch-containing substrate. No. 2,422,455. Lynferd J. Wickerham.

Article composed throughout of single glass containing copper equivalent to at least .05% Cu_2O and having heat stable picture exhibiting photographic detail formed in glass in various shades of color of one hue. No. 2,422,472. Robert H. Dalton to Corning Glass Works.

Apparatus for fire-polishing glass articles. No. 2,422,482. Edwin M. Guyer to Corning Glass Works.

Coatings

Polyvinyl halide composition which is rigid at 45-85°C. and which can be shaped by extrusion at 160-180°C. comprises 70-99.5% by weight of vinyl halide polymer in substantially homogenous admixture with not to exceed 12.5% by weight of plasticizer and chlorinated paraffin wax containing 30-50% by weight of chlorine in amount equal to not less than 0.5% by weight and not more than 5% by weight when substantially no plasticizer is present. No. 2,421,408. Ernest Francis Brookman and Stephen Frederick Pearce to Imperial Chemical Industries Limited.

Vinyl halide polymer which can be readily shaped by extrusion to produce articles of improved power factor and volume resistivity comprising vinyl halide polymer in homogenous admixture with plasticizer and chlorinated paraffin wax containing 35-55% by weight of chlorine, proportion of wax being 1-65% of combined weights of said wax and plasticizer composition containing at least 40% but less than 70% by weight of polymer. No. 2,421,409. Ernest Francis Brookman and Stephen Frederick Pearce to Imperial Industries Limited.

Apparatus for use in chemical coating of metal strips. No. 2,421,610. Robert H. Gordon to Parker Rust-Proof Company.

Removing electrically insulating coating comprising polyvinyl acetal resin from electrical conductor by immersing coated conductor in bath of molten potassium iodide. No. 2,421,617. Phyllis Holmes to Metropolitan-Vickers Electrcial Company Limited.

Making enamelled article by applying aqueous solution of sodium silicate to ferrous metal base having aluminum coating, heating article to high temperature to alloy aluminum with base material, form aluminum oxide and dehydrate the sodium silicate, coating article with vitrifiable enamel heating article to lower temperature to vitrify enamel. No. 2,421,719. Glen R. Simmons to Western Electric Company, Inc.

Matt black coating composition comprising solution of cellulose ether and pigment powder comprising aniline black. No. 2,422,429. John David Main-Smith and Edwin Charles Jones.

Canadian

Process for waterproofing polysulphide rubber latex film. No. 433,295. Stoner-Mudge, Inc. (Frank R. Stoner, Jr. and Wallace K. Schneider)

Dyes, Pigments

Azo dyes from 2,6 dihalo 4 nitraniline. No. 2,421,553. Friedrich Felix and Rudolf von Capelle to Society of Chemical Industry.

Color composition comprising vat dye and crystallizable alkyl carbamate having structural formula described in patent. No. 2,421,622. Roy Herman Kienle and Chester Albert Amick to American Cyanamid Company.

Chromium complex of azo dye having formula described in patent. No. 2,421,737. Byron L. West and Charles Edward Lewis to American Cyanamid Company.

Diazoamino compounds. No. 2,422,359. Carl W. Maynard, Jr. and Emil G. Wiest to E. I. du Pont de Nemours & Company.

Producing Victoria Pure Blue BO. No. 2,422,445. Harvey Irvin Stryker and Ralph Otto Heuse to E. I. du Pont de Nemours & Company.

Equipment

In apparatus for fusing coating of tablets, combination of tablet feed means including spacing roller, conveyer, flame producing means, means for driving conveyer to conduct tablets through flame and for conveying tablets until fused coating is cooled, means for inverting tablets, second conveyor, second flame producing means. No. 2,421,801. Grover C. Miller to Gromiller Inc.

Furnace for expanding pearlite granules. No. 2,421,902. Robert Neuschotz.

Primary cell comprising amalgamated zinc anode having extended surface area and at least surface thereof amalgamated with mercury, electrolyte comprising solution of alkali metal hydroxide substantially saturated with zinc oxide and depolarizer cathode formed of reducible oxide, mixed with conductive material to increase conductivity thereof, and alkali-resistant absorbent spacer material interposed between anode and cathode, etc. No. 2,422,045. Samuel Ruben.

Primary cell structure comprising metal cup having depolarizing oxide cathode compressed in bottom thereof, anode formed of roll of foil and electrolyte impregnated spacer enrolled therewith and separating turns thereof, roll having end disposed adjacent surface of cathode, parallel thereto. No. 2,422,046. Samuel Ruben.

Apparatus for contacting solid particles with gaseous fluids. No. 2,422,262. Barrett B. Russell, 3d, to Standard Oil Development Company.

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* *U. S. Patents from Vol. 598, Nos. 1, 2, 3, 4. Canadian from July 1 - July 22, 1947.*

Explosives

Process for preparing maximum density blasting gelatin comprises cooling liquid explosive comprising nitroglycerin to temperature from −10°C to 10°C without freezing; adding mixture comprising nitrocellulose and antacid to explosive; mixing mass thus formed with minimum amount of agitation, while maintaining said temperature; and discharging cooled mixed mass and allowing mass to warm and gelatinize. No. 2,421,536. Henry W. Botts to Hercules Powder Company.

New product, crystalline particles of lead azide characterized by content throughout particles of minor proportion of polyvinyl alcohol, comprising 95 to 97% PbN_6 particles having been formed in aqueous solution containing polyvinyl alcohol. No. 2,421,778. Joseph Fleischer and Jerome G. Burtle to Olin Industries, Inc.

Food

In preparing sweetening medium from fruit, steps which comprise adding alkaline defecating agent to composition obtained by grinding fruit material and comprising sweetening ingredients of fruit in amount to increase pH of fruit composition to the pH above 10 at which break occurs, when reaction at this pH is complete adding acid defecating agent in amount to reduce pH to between pH 9.2 and pH 6.3, separating precipitate. No. 2,421,376. Arvid M. Erickson and John D. Ryan to Barron-Gray Packing Company.

Bleaching crystalline sugar while simultaneously preventing bacterial action, comprises subjecting crystalline sugar to action of solution containing chlorite of non-toxic metal with hydrogen ion concentration between pH 4 and pH 8. No. 2,421,380. Horace S. Isbell.

Apparatus for continuous deodorization of animal or vegetable oils. No. 2,422,185. Dion K. Dean to Foster Wheeler Corporation.

Margarine dispersion including aqueous disperse phase and continuous phase consisting edible fatty acid glyceride, and having included therein proportion of condensation product of higher fatty acid and polysaccharide of the second order, condensation product having at least one hydroxy group of polysaccharide of second order free. No. 2,422,633. Boerge Petersen.

Canadian

Stabilizing edible fatty products by incorporating therein 0.1 per cent of each of p-amino benzoic acid and a compound having the ene-diol grouping. No. 443,737. General Mills, Inc. (Frank A. Norris).

Stabilizing a fatty product against rancidity by incorporating therein 1-ascorbic acid and diethanolamine. No. 443,738. General Mills, Inc. (Frank A. Norris).

Inorganic

Producing gaseous oxygen comprises alternately passing flowing streams of air and steam at approximately equal operating pressures above two atmospheres absolute in contact with hot solid manganate type contact mass maintained at 1100° to 1300°F. contact mass being oxidized by passage of air thereafter deoxidized to release oxygen by passage of steam in contact therewith. No. 2,421,381. Leslie G. Jenness to The Linde Air Products Company.

Calcining carbonate material for recovery of oxide and gas of high carbon dioxide content. No. 2,421,542. George E. Connolly to Nichols Engineering & Research Corporation.

Sulfones corresponding to general formula described in patent. No. 2,421,836. Moses Wolf Goldberg to Hoffmann-La Roche, Inc.

Producing relatively thin sheets from relatively thick solid body of silver chloride. No. 2,422,323. Edwin G. Waltman to National Steel Corporation.

Preparation of improved supported molybdenum oxide catalyst having enhanced stability against loss of activity upon heating at temperature up to 800°C. No. 2,422,372. Albert E. Smith and Otto A. Beeck to Shell Development Company.

Improved process for producing spherical particle of alumina gel comprises preparing alumina sol, suspending droplets of alumina sol of desired size in viscous organic water-immiscible inert liquid. No. 2,422,499. Jerry A. Pierce and Charles N. Kimberlin, Jr., to Standard Oil Development Company.

Electrolyte for production of elemental fluorine consisting of 81.7% by weight of potassium bifluoride 14.3% of hydrogen fluoride and 4% of lithium fluoride. No. 2,422,590. Walter C. Schumb and Arthur J. Stevens.

Rectifying air into its major constituents comprises refrigerating air without liquefaction at slightly elevated pressure passing refrigerated air into rectifying column, etc. No. 2,422,626. Franz Koehler.

Removing iron dissolved in molten acid potassium fluoride, comprises adding sodium fluoride to molten salt to precipitate solid fluoride of sodium and iron, separating precipitated solid fluoride from molten salt. No. 2,422,907. Paul R. Johnson.

Canadian

Ester of ortho inorganic acid of titanium, tin and aluminum with unsaturated primary alcohols. No. 443,425. Canadian Industries, Ltd. (Henry Shirley Rothrock).

Medicinal

Vaccine of high potency having antigenic properties equal to those of untreated suspension of organisms comprising sterile suspension of organisms which has been subjected to ultra-violet irradiation for period of less than 10 seconds by lamp having output of not less than 0.1 milliwatt per square centimeter of energy below 2000 A. No. 2,421,382. Sidney O. Levinson and Franz Oppenheimer to Michael Reese Research Foundation.

Process for manufacture of compounds with oestrogenic activity selected from group consisting of apha,beta-(p,p′-dihydroxy-diphenyl)-alpha,beta-dialkyl-ethanes and alpha,beta-(p,p′-dihydroxy-diphenyl)-alpha, beta- dialkyl-ethylenes. No. 2,421,401. Erich Adler, Gert J. Gie and Hans von Euler to Hoffmann-La Roche Inc.

Insulin kit. No. 2,421,495. Lloyd G. Green.

Readily water-dispersible multivitamin composition comprising ethanol, at least one fat-soluble vitamin, riboflavin, at least one water-soluble vitamin other than riboflavin and blending solvent selected from glycerine and lactic acid. No. 2,421,598. Loran Oid Buxton and Sol Tobias Lipsius to Nopco Chemical Company.

Vermifuge unit for administration to pigs of body weight in range of 35 to 65 pounds to effect removal of ascarid worms, ascaricide ingredients of unit being approximately 1¼ grains of santonin and not less than 4 grams of phenothiazine. No. 2,422,106. Raymond E. Lubbehusen to Ralston Purina Company.

Preparing streptothricin comprises cultivating micro-organism Actinomyces lavenduale under aerobic submerged conditions in aqueous medium containing assimilable source of carbon and energy and complex organic mixture containing nitrogenous substances. No. 2,422,230. Jackson W. Foster and Harold Boyd Woodruff to Merck & Co., Inc.

Aqueous germicidal rinse composition comprising one part of 1,3-dichloro-5,5-dimethylhydantoin, one part of 5,5-dimethylhydantoin, two parts of sodium dodecyl sulfate and ten parts of sodium dihydrogen phosphate. No. 2,422,255. Franklin T. Peter to E. I. du Pont de Nemours & Company.

Vitamin B_6 intermediates and process of preparing. No. 2,422,616. Stanton A. Harris to Merck & Co., Inc.

Vitamin B_6 intermediates, formula described in patent. No. 2,422,617. Stanton A. Harris to Merck & Co., Inc.

Vitamin B_6 intermediates, formula described in patent. No. 2,422,618. Stanton A. Harris to Merck & Co., Inc.

Vitamin B_6 intermediate, formula described in patent. No. 2,422,619. Stanton A. Harris to Merck & Co., Inc.

Vitamin B_6 intermediates, formula described in patent. No. 2,422,620. Stanton A. Harris to Merck & Co., Inc.

Vitamin B_6 intermediates, formula described in patent. No. 2,422,621. Stanton A. Harris to Merck & Co., Inc.

In synthesis of vitamin B_6, step comprises treating 2-methyl-3-amino-4-hydroxymethyl-5-amino-methylpyridine dihydrohalide with diazotizing agent and recovering vitamin B_6 hydrohalide. No. 2,422,622. Stanton A. Harris to Merck & Co., Inc.

Hydrolytic decomposition method of obtaining levorotatory thyrosine from thyroprotein compositions without recemization. No. 2,422,938. Charles W. Turner and Ezra P. Reineke to American Dairies Incorporated.

Cold sterilizing solution including reaction product of mixing of phenyl mercury compound selected from nitrate and borate, much larger amount of ethanol amine acid. No. 2,422,951. Goldsmith Hall Conant, Jr.

Preparing riboflavin modification comprises reacting in presence of heat riboflavin with gallic acid in presence of dilute acid selected from sulphuric acid, phosphoric acid, and hydrochloric acid. No. 2,423,074. Margaret Rose Zentner to Hoffmann-La Roche Inc.

Metals, Ores

Removing from surface of metals resistant to fused caustic alkalies dense firmly adherent oxide that has formed thereon through exposure to air under oxidizing conditions. No. 22,887. Harry R. Spence and Horace W. Hooker to Hooker Electrochemical Company.

Improvement in method of producing electrolytic copper by multiple system. No. 2,421,582. Hugh M. Shepard and James Howard Bryan to American Smelting and Refining Company.

Beneficiating low grade bauxite ores, which ores comprise bauxite-minerals-particles aggregated with excess of firmly-attached hydratable silica-bearing gangue, to produce high grade bauxite concentrate suitable for the production of metallic aluminum and assaying not more than 7% silica. No. 2,421,648. Roy Alderson Pickens to American Cyanamid Company.

Treating naturally occurring earths, such as kaolin, marl, and other earths containing silicon and aluminum for production of aluminum oxide. No. 2,421,918. Frank J. Anderson and Duncan R. Williams to Monolith Portland Midwest Company.

Method of casting light metal alloys that includes preparing green sand core consisting of sand, water and a hardenable urea-formaldehyde reaction product as binder. No. 2,422,118. Leonard S. Meyer to Libbey-Owens-Ford Glass Company.

In ore dressing art, in which ore is ground in closed circuit with classification, improvement comprises subjecting discharge of grinding stage to succession of centrifugal sink and float separations at classification stage to maintain finished product at or near surface, etc. No. 2,422,203. Harry L. McNeill.

Taeniacidal mixture comprising minor portion of ferric arsenate and major portion of tin salt chosen from group consisting of stannous maleate, stannous fumarate and stannous butyrate. No. 2,422,411. James Erwin Guthrie to Dr. Hess & Clark, Inc.

Sluice box for treating alluvials for recovery of minerals therefrom. No. 2,422,442. Joseph P. Smith.

Bending cemented carbide wire comprises attaching one end of wire to drum, applying tension to wire, supplying external heat to wire at point adjacent drum, heating other portions of wire and finally bending heated wire on drum. No. 2,422,636. George F. Taylor to Carboloy Company, Inc.

Treating stainless steel articles, comprises electrolyzing such article as anode at anode current density of from about 250 to 540 amperes per square foot in electrolyte consisting of water solution of fluosilicic acid of from 10% to 60% concentration for twenty seconds to two minutes, etc. No. 2,422,903. Kenneth M. Huston to Western Electric Company, Incorporated.

Ferrous alloy containing from 3% to 5% carbon, from 2% to 10% nickel from 8% to 22% chromium from 6% to 12% molybdenum and from 2.25% to 5.5% silicon and remainder of iron, etc. No. 2,422,948. Arthur T. Cape and Charles V. Foerster to Coast Metals, Inc.

Ferrous alloy containing from 3.75% to 4.6% carbon, from 8% to 28% chromium, from 6% to 12% molybdenum, from 1% to 3% silicon, and nickel in appreciable amounts up to 1.75% balance of alloy being substantially all iron. No. 2,422,949. Arthur T. Cape and Charles V. Foerster to Coast Metals, Inc.

Vacuum evaporation of zinc from zinc-bearing lead. No. 2,422,967 William T. Isbell to St. Joseph Lead Company.

Froth flotation of silica from iron ore by anionic collectors. No. 2,423,022. Earl Conrad Herkenhoff to American Cyanamid Company.

Selenium depositing machine. No. 2,423,051. Cleveland Scudder Smith, Jr. and Sol Blumenthal.

Canadian

Treatment of zircon stand by heating with lime between 1200° and 1250° C. to produce a sintered calcium silico-zirconate. No. 443,199. F. W. Berk and Company, Ltd. (Mojzesz Ozjasz Axt)

Organic

Making ethers of lactic acid esters, comprises heating pyruvic aldehyde di-acetal at above 100°C. in presence of acid catalyst and alcohol. No. 2,421,378. Howard R. Guest, Louis G. MacDowell and Raymond W. McNamee to Carbide and Carbon Chemicals Corporation.

In production of oxygenated products, steps of subjecting vapors of saturated aliphatic hydrocarbon having at least two carbon atoms per molecule to action of oxygen in presence of effective amount of hydrogen bromide and between 0.1% and 10% by volume of organic peroxide effecting reaction at 100°C to 225°C. No. 2,421,392. Frederick F. Rust, John H. Raley and William E. Vaughan to Shell Development Company.

Diaryl-dialkyl-ethane derivatives and process for manufacture. No. 2,421,402. Erich Adler to Hoffmann-La Roche Inc.

Additional patents from the above volumes will be given next month.

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

430,499. Koch Products Company, as Koch Chemical Co., Winona, Minn.; filed Apr. 25, 1946; Serial No. 500,882; for washing compound in powder form; since Mar. 19, 1946.

430,525. Ferro-Glo Corporation, Erie, Pa.; filed July 17, 1946; Serial No. 505,746; for chemical compound for preventing and removing rust; since Dec. 26, 1945.

430,843. Stanley Home Products, Inc., Westfield, Mass.; filed Oct. 23, 1945; Serial No. 490,406; for furniture cream, automobile polish and floor wax; since July 13, 1931.

430,858. Alymp-Ol Soap & Chemical Co., Taunton, Mass.; filed April 15, 1946; Serial No. 500,199; for furniture polish; scratch removers, etc.; since July 2, 1943.

470,937. Carbide and Carbon Chemicals Corporation, New York, N. Y.; filed June 6, 1944; for chemical compounds for use in or as hydraulic fluids, heat transfer media, as plasticizers, and in lubricants.

474,843. Herbert W. Wilkinson, Jr., Southbridge, Mass.; filed Oct. 2, 1944; for ethyl lactate, dimethyl phthalate, aqueous solutions of metallic salts, fatty alcohols, fatty acid esters, and sulphonated oil; since Jan. 18, 1944.

475,456. Philco Corporation, Philadelphia, Pa., filed Oct. 18, 1944; for synthetic plastic resin in liquid form; since February 1934.

491,482. Kerr Dental Manufacturing Company, Detroit, Michigan to Kerr Manufacturing Company; filed Nov. 13, 1945; for investment compounds of ceramic nature; since Sept. 26, 1945.

494,071. Industrial Tape Corporation, New Brunswick, N. J.; filed Dec. 29, 1946; for adhesive cements; since July 13, 1945.

494,792. Irvington Varnish & Insulator Co., Irvington, N. J.; filed Jan. 15, 1946; for extruded resinoid plastic materials; since Oct. 2, 1944.

499,906. Maas & Waldstein Company, Newark, N. J.; filed Apr. 9, 1946; for ready mixed paints, paint primers, clear lacquers, pigmented lacquers; since Mar. 7, 1946.

499,952. Instant Products Company, Inc., Buffalo, N. Y., filed Apr. 10, 1946; for liquid polishes; since Jan. 15, 1915.

500,141. Socony-Vacuum Oil Company, Incorporated, New York, N. Y.; filed Apr. 12, 1946; for wax polishing compositions; since Mar. 20, 1933.

500,572. Anne Bishop Ray, Raleigh, N. C., filed Apr. 19, 1946; for liquid furniture polish, etc.; since June 30, 1896.

502,959. Fibrcan Corporation, New York, N. Y.; filed May 29, 1946; for material or waste cans of plastic, paper, or base metal; since Mar. 15, 1946.

503,165. Lion Cleaners, Englewood, N. J.; filed June 1, 1946; for moth crystals; since Apr. 3, 1946.

503,247. The Elco Lubricant Corporation, Cleveland, Ohio, filed June 4, 1946; for a chemical concentrate to be used in lubricants; since Feb. 21, 1945.

503,406. H. Kirk White and Company, Oconomowoc, Wisconsin, filed June 6, 1946; for copper paints; since Mar. 1, 1946.

503,453. Winthrop A. Johns, doing business as Clearust, North Plainfield, N. J.; filed June 7, 1946; for chemical for removing and inhibiting formation of rust and scale; since Apr. 1, 1946.

503,495. J. Berlage Co., Inc., New York, N. Y.; filed June 8, 1946; for insecticides and fungicides; since December 1945.

503,510. Benjamin Foster Company, Philadelphia, Pa., filed June 8, 1946; for ready-mixed paints and paint primers, since May 16, 1946.

504,005. Southeastern Chemical Company, Inc., Atlanta, Ga., filed June 15, 1946; for cream furniture polish, etc.; since May 1, 1946.

504,029. Brown-Bassman Co., New York, N. Y., filed June 17, 1946; for emulsified plastic coating composition; since Apr. 12, 1946.

504,400. Socony-Vacuum Oil Company, Incorporated, New York, N. Y.; filed June 21, 1946; for petroleum and products of petroleum; since Aug. 5, 1946.

504,585. Charles W. Scott, Butte, Mont.; filed June 25, 1946; for waterproofing compound for leather goods; since Sept. 15, 1945.

504,619. Kirker Chemical Company, Paterson, N. J., filed June 26, 1946; for lacquers, alkyd enamels and varnishes; since May 28, 1946.

505,232. Jake C. Powell as Pure Paint Producers, Greenville, Tex., filed July 8, 1946; for ready mixed paints; since Mar. 1, 1946.

505,931. The United Piece Dye Works, Lodi, N. J.; filed July 19, 1946; for chemical preparation to render fabrics crease resistant; since Feb. 17, 1944.

505,974. Monsanto Chemical Company, St. Louis, Mo., filed July 20, 1946; for chemical toxicants for use in combating insects and fungi; since July 10, 1946.

506,084. Aridye Corporation, New York, N. Y., to Interchemical Corporation, New York, N. Y., corp. of Ohio; filed July 23, 1946; for dyestuffs and textile coloring materials; since July 20, 1945.

506,662. General Chemical Company, New York, N. Y., filed Aug. 1, 1946; for liquid insecticidal product; since June 26, 1946.

507,402. International Plastics, Inc., Boston, Mass., filed Aug. 14, 1946; for plastic compositions as sheets, strips, blocks, rods, and tubes; since Mar. 30, 1946.

507,403. International Plastics, Inc., Boston, Mass.; filed Aug. 14, 1946; for plastic compositions; since Mar. 30, 1946.

507,693. The Resinous Products & Chemical Company, Philadelphia, Pa., filed Aug. 20, 1946; for synthetic organic chemicals as softeners, modifiers, elasticators, and plasticizers of resinous and/or rubbery materials since July 17, 1946.

507,798. Calgon, Incorporated, Pittsburgh, Pa.; filed Aug. 22, 1946; for chemical compound for treating all types of metals to prevent corrosion; since Aug. 19, 1943.

507,826. Innis, Speiden & Co., New York, N. Y.; filed Aug. 22, 1946; for soil fumigation; since June 30, 1944.

507,844. The Resinous Products & Chemical Company, Philadelphia, Pa.; filed Aug. 22, 1946; for synthetic or chemically-modified resinous materials in solid form; since May 16, 1924.

507,846. The Resinous Products & Chemical Company, Philadelphia, Pa.; filed Aug. 22, 1946; for synthetic resinous materials in form of granules, powders, and solutions; since Sept. 14, 1934.

508,349. Worth Lacquer and Chemical Company, New York, N. Y. to Worth Lacquer and Chemical Company, Inc., New York, N. Y.; filed Aug. 30, 1946; for enamel liquid lacquer; since Oct. 20, 1944.

508,513. Continental Laboratories, Chicago, Ill., filed Sept. 5, 1946; for insecticides; since Nov. 6, 1945.

508,516. Dodge & Olcott, Inc., New York, N. Y., filed Sept. 5, 1946; for insectifuges; since May 14, 1946.

508,625. Sun Oil Company, Philadelphia, Pa., filed Sept. 6, 1946; for plasticizer for rubber; since June 11, 1946.

509,349. Kinetic Chemicals, Inc., Wilmington, Del.; filed Sept. 19, 1946; for monochlorotrifluoromethane; since Dec. 13, 1945.

509,350. Kinetic Chemicals, Inc., Wilmington, Del.; filed Sept. 19, 1946; for monochlorotrifluoromethane; since Dec. 13, 1945.

509,351. Kinetic Chemicals, Inc., Wilmington, Del.; filed Sept. 19, 1946; for carbontetrafluoride; since Feb. 13, 1946.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, June 3 - June 24.

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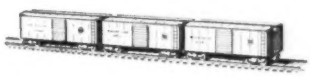

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Technical—Ground or Flake
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(Genitox* S50)

50% DDT Dust Base, Micro-Fine
(Genitox D50)

Emulsifiable Oil Concentrates
(Genitol† EM25 and EM30)

Solvent Concentrates
(Genitol SC30 and SC40)

BHC

Benzene Hexachloride

Technical Grade

Dust Base (Finely Milled)

Wettable Powder

Dust Mixtures

Oil Concentrates

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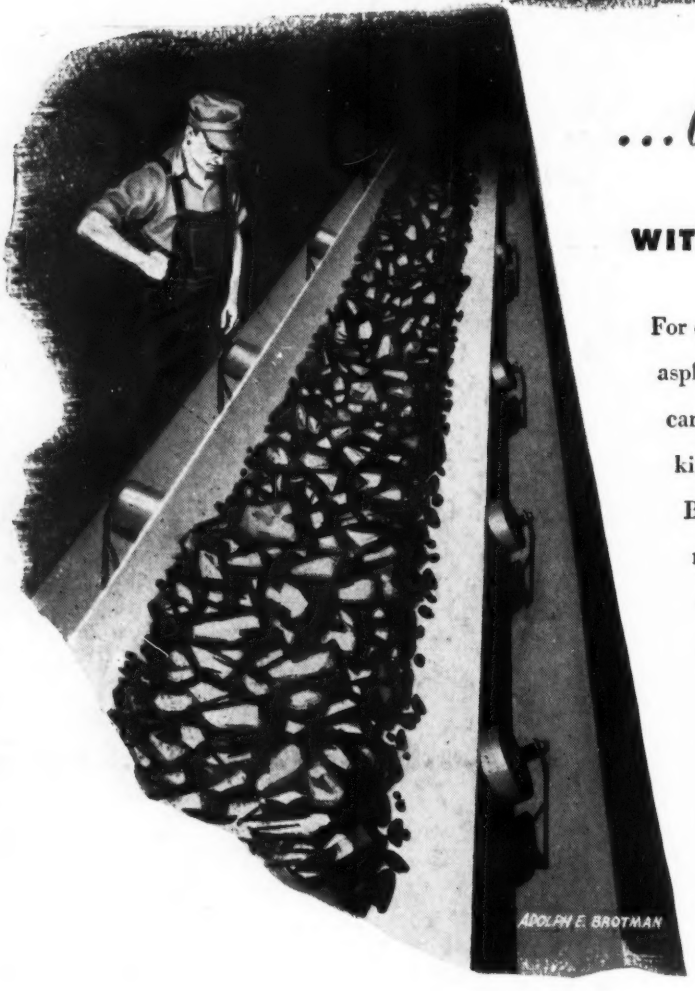

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